



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines


Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

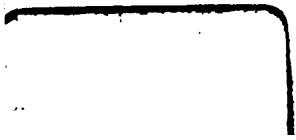
- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



BOSTON
MEDICAL LIBRARY
8 THE FENWAY



DUP.
F.M.

ST. GEORGE'S HOSPITAL

REPORTS.

EDITED BY

JOHN W. OGLE, M.D. F.R.C.P.

AND

TIMOTHY HOLMES, F.R.C.S.

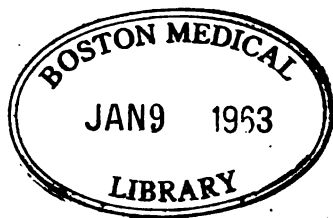
VOL. V. 1870.



LONDON:

J. & A. CHURCHILL, NEW BURLINGTON STREET.

MDCCLXXI.



LONDON:
ROBSON AND SONS, PRINTERS, FANCY ROAD, N.W.

LIST OF SUBSCRIBERS TO THE "ST. GEORGE'S HOSPITAL REPORTS."

Abercrombie, J., M.D., Cheltenham.
Acland, H. W., M.D., Regius Professor of Medicine, Oxford.
Allbutt, T. C., M.D., 38 Park-square, Leeds.
Andrews, H. C., M.D., 1 Oakley-square, N.W.
Arlidge, J. T., M.D., Blurton House, Stoke-on-Trent.
Bagshawe, F., M.D., Hastings.
Bainbridge, F., 1 George's-terrace, York-place, Harrogate.
Ballard, T., M.D., 10 Southwick-place, Hyde-park-square, W.
Banner, Samuel, 11 Delamere-street, Westbourne-square, W.
Barclay, A. W., M.D., 23A Bruton-street, Berkeley-square, W.
Barnes, Edgar P., M.B., St. George's Hospital, W.
Barratt, Dr., 8 Cleveland-gardens, W.
Bennett, C. H., M.D., College House, Hammersmith, W.
Blackett, J. B., 28 Green-street, Grosvenor-square, W.
Blagden, R., 2 Rowcroft, Stroud, Gloucestershire.
Blake, C. P., M.D., Anglesey House, Torquay.
Blandford, J. F., M.D., 71 Grosvenor-street, W.
Bowles, R., M.D., 8 West-terrace, Folkestone.
Bradford, E., 4 Roxborough-park, Harrow.
Braine, F. W., 56 Maddox-street, W.
Brodhurst, B. E., 20 Grosvenor-street, W.
Brodie, G. B., M.D., 56 Curzon-street, Mayfair, W.
Brown, C. B., 8 Hill-street, Berkeley-square, W.
Bucknill, R., Rawtenstall, near Manchester.
Bullock, H., Spring-grove, Isleworth, W.
Bulsteel, C., 62 Dunford-street, Stonehouse, Plymouth.
Callender, G. W., 47 Queen Anne-street, Cavendish-square, W.
Carnley, H., M.D., 56 Charlotte-street, Hull.
Carter, R. B., 69 Wimpole-street, Cavendish-square, W.
Cavafy, J., M.D., 5 Whitehall, S.W.
Cheadle, W. B., M.D., 2 Hyde-park-place, Cumberland-gate, W.
Clarke, J., M.D., 42 Hartford-street, W.

- Clarke, J. A. Lockhart, M.D., 60 Warwick-street, S.W.
Coles, G. C., 20 Great Coram-street, Russell-square, W.C.
Collyer, J., M.D., Oak House, Enfield, Middlesex.
Copeman, E., M.D., King-street, Norwich.
Courtney, S., Leatherhead, Surrey.
Cowell, G., 65 Belgrave-road, S.W.
Curtis, W. jun., Alton, Hants.
Darke, F. P., Salisbury.
Dickinson, W. H., M.D., 11 Chesterfield-street, Mayfair, W.
Dodd, H. A., 10 Seymour-street, Portman-square, W.
Dodsworth, F. C., M.D., Oxford Villa, Turnham-green, W.
Dodsworth, F. C. jun., Portland Villa, Turnham-green, W.
Dudfield, T. G., M.D., 8 Upper Phillimore-place, Kensington, W.
Duncan, P. C., M.D., 46 Great Marlborough-street, W.
Duncan, T., M.D., The Green, Richmond, Surrey.
Du Pasquier, C. F., 62 Pall Mall, S.W.
Eccles, E., New Town, Longridge, Preston, Lancashire.
Edgelow, T., 25 Mount-street, W.
Emerson, W., 1 Oseney-crescent, Camden-road, N.W.
Evans, Dr., 40 Queen's-road, Bayswater, W.
Evershed, A., Ampthill, Beds.
Ewen, Algernon, Long Sutton, Wisbeach.
Ewens, J., Barton Lodge, Cerne Abbas, Blandford, Dorsetshire.
Falls, W. S., M.D., Woodcote, Bournemouth, Hants.
Fenwick, J. C. J., M.D., Junior University Club, St. James's-street, W.
Filkin, R., Ormond-terrace, Richmond, S.W.
Forder, T., Clarence Villa, Earl's-court, Old Brompton, S.W.
Foster, B., M.D., Birmingham.
Fox, E., M.D., Church House, Clifton.
Foxon, F., 231 Brompton-road, S.W.
Freeborn, Dr., Oxford.
Fuller, H. W., M.D., 18 Manchester-square, W.
Fuller, W., 111 Piccadilly, W.
Fussell, E. F., M.D., 34 Queen's-road, Brighton.
Garland, E. C., Yeovil.
Gibson, J. E., Medina Lodge, West Cowes, Isle of Wight.
Gilbertson, J. B., M.D., 81 Fishergate, Preston.
Giles, S., M.D., 2 Kent Villa, Lewisham-road, Deptford, S.E.
Godden, Jos., Sudley House, Birkenhead.
Godson, C., Barnet, Herts.
Goldsmith, G. P., 3 Harpur-place, Bedford.
Greig, C., 16 York-place, Clifton.
Haffenden, D.A., 7 Bath-place, Kensington, W.

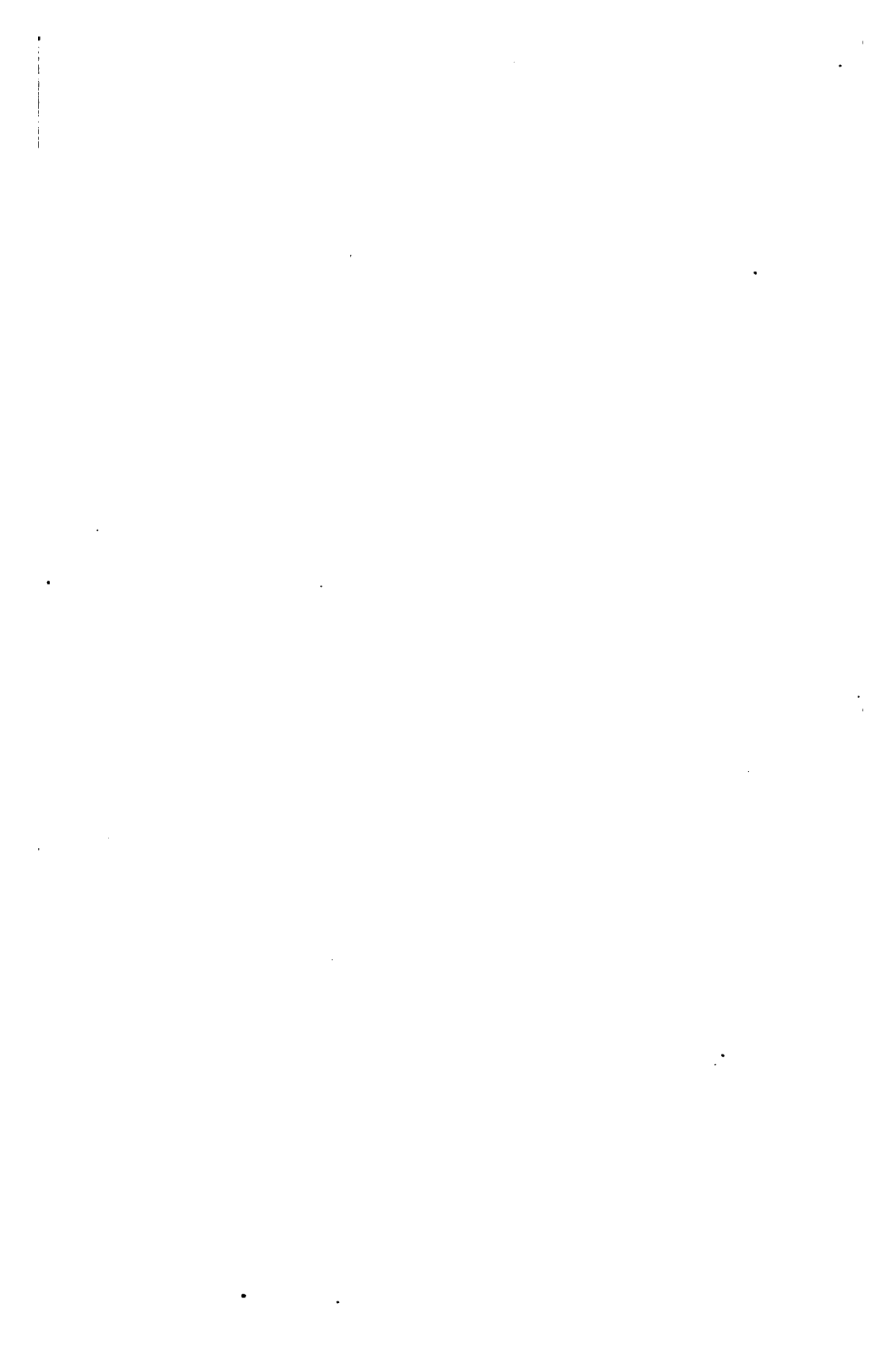
LIST OF SUBSCRIBERS.

v

Hall, J. C., M.D., Sheffield.
 Hall, N. F., The Neckinger House, Bermondsey, S.E.
 Hammerton, T., Carlton-street, Cheltenham.
 Hammond, G., Irthlingborough, Higham Ferrers.
 Harmer, W. M., M.D., North-Grove House, Hawkhurst.
 Harrison, E., 11 Paragon, Streatham-hill, S.W.
 Haward, J. Warrington, 46 Queen Anne-street, Cavendish-square, W.
 Haward, —, M.D., M'Gill College, Montreal.
 Hawkins, Charles, 22 Savile-row, W.
 Hawkins, Caesar H., 26 Grosvenor-street, W.
 Henderson, A., Great Malvern.
 Hewett, Prescott G., 1 Chesterfield-street, Mayfair, W.
 Hocken, C. E., M.D., Truro-road, Wood-green, N.
 Hodgson, G. F., 52 Montpelier-road, Brighton.
 Holderness, W. B., Wykeham House, Huntingdon.
 Holmes, T., 31 Clarges-street, Piccadilly, W.
 Hope, W., M.D., 42 Curzon-street, Mayfair, W.
 Horne, T. B., Adwell, Torquay.
 Hotham, R. H., Thames Ditton, Surrey.
 Hudson, R.S., M.D., Royal Albert Hospital, Devonport.
 Hunt, W. J., M.D., Hoxton-House Asylum, N.
 Hunter, C., 30 Wilton-place, Belgrave-square, S.W.
 Hurd, J., West Lodge, Frome, Somerset.
 Hutton, C., M.D., 26 Lowndes-street, S.W.
 I'Anson, T. F., M.D., Whitehaven.
 Iles, H. W., M.D., Watford, Herts.
 Jackson, A., St. James's-row, Sheffield.
 Johnson, Athol, 20 Regency-square, Brighton.
 Jones, H. Bence, M.D., 84 Brook-street, W.
 Jones, T., M.D., 28 Chapel-street, Belgrave-square, S.W.
 Keen, W., 209 King's-road, Chelsea, S.W.
 Kendall, T. M., King's Lynn, Norfolk.
 Lee, Henry, 9 Savile-row, W.
 Lee, R. J., M.D., 4 Savile-row, W.
 Leigh, T., 1 Grove Park-road, Chiswick, W.
 Leigh, W., Annandale House, Turnham-green, W.
 Liverpool Medical and Surgical Reports, Editors of, 48 Church-street, Liverpool.
 Lovell, F. O., 10 Brondesbury-villas, Kilburn, N.W.
 Mackay, A. D., M.B., Stony Stratford, Bucks.
 Maconchy, John K., M.D., Infirmary House, Downpatrick.
 Marshall, J. B., Nightingale-road, Downs, Clapton, E.
 Martin, E., Victoria House, Weston-super-Mare.

- M'Cormac, W., M.D., 4 Howard-street, Belfast.
 Merriman, J. J., 45 Kensington-square, W.
 Midland Medical Society, per Mr. Mackey, Newhall-street, Birmingham.
 Milner, W., 22 Lower Belgrave-street, S.W.
 Mitchell, J. J., 16 Catherine-place, Bath.
 Morgan, J., 3 Sussex-place, Hyde-park, W.
 Mosely, B. E., 5 Grosvenor-street, W.
 Mould, J. T., 1 Onslow-crescent, Brompton, S.W.
 Nairne, R., M.D., 19 Whitehall-place, S.W.
 Nayler, G., 8 George-street, Hanover-square, W.
 Nicholls, James, M.D., Chelmsford.
 Norman, G. A., M.B., Ilkeston, Derbyshire.
 Nourse, W. E. C., 11 Marlborough-place, Brighton.
 Ogle, John W., M.D., 30 Cavendish-square, W.
 Ogle, W., M.D., 34 Clarges-street, W.
 O'Grady, E. S., M.D., 105 Stephen's-green South, Dublin.
 Page, A. H., M.D., Vale House, Duckworth-street, Over Darwen,
 Lancashire.
 Palmer, J. F., Wilby, Attleborough, Norfolk.
 Parry, H. H., Kidlington, Oxon.
 Payne, G. F., M.D., 50 Green-street, Grosvenor-square, W.
 Philips, G. R. T., 27 Leinster-square, W.
 Pick, T. P., 7 South Eaton-place, S.W.
 Pitman, H. A., M.D., 28 Gordon-square, W.C.
 Pollock, G. D., 86 Grosvenor-street, W.
 Pope, J. R., Iver, Bucks.
 Power, H., 45 Seymour-street, W.
 Preston Medical Society, per Mr. Arminson, 7 Lime-street, Preston.
 Pyle, J., 59 Oxford-terrace, W.
 Radford, T., M.D., Moorfield, Higher Broughton, Manchester.
 Roberts, A., 30 Kensington-square, W.
 Roberts, Charles, Uxbridge.
 Roberts, C., 2 Bolton-row, Mayfair, W.
 Roberts, W. P., Cheshunt.
 Rogers, Goddard, M.D., 29 Grosvenor-street, W.
 Ross, J. T. C., Budleigh Salterton, Devon.
 Rouse, J., 2 Wilton-street, Grosvenor-place, S.W.
 Royston, C., M.D., 1 St. Stephen's-crescent, Westbourne-park, W.
 Sabben, Dr., Northumberland House, Stoke Newington.
 School of Medicine, Park-street, Leeds.
 Seaton, D., Oakham, Rutland.
 Sharp, H. L., 24 Talbot-square, Hyde-park, W.
 Shearman, E. J., M.D., Moorgate, Rotherham.

Shepherd, J. C., Ambleside, Westmoreland.
Sims, F. M., F.R.C.S., 25 Half-moon-street, Piccadilly, W.
Smith, H. Fly, M.D., 1 Queen's-crescent, Haverstock-hill, N.W.
Smith, Heywood, M.D., Portugal-street, W.
Smith, T. H., 13 John-street, Berkeley-square, W.
Spitta, R. J., M.D., Clapham Common, S.W.
Staff, G. T. A., Wadebridge, Cornwall.
Steet, G. C., Melbourne House, Roslyn-hill, Hampstead, N.W.
Stevens, C. H. S., 15 Gloucester-terrace, Campden-hill, W.
Strong, H. J., M.D., 64 North End, Croydon.
Sturges, O., M.D., 85 Wimpole-street, W.
Sutherland, H., M.B., West Riding Asylum, Wakefield.
Symmons, F., Queen-street, Colchester.
Tegart, E., 49 Jermyn-street, S.W.
Tepper, John, 27 Upper George-street, Portman-square, W.
Thompson, R., M.D., 21 South-street, Grosvenor-square, W.
Tuke, Harrington, M.D., Manor House, Chiswick.
Vasey, C., 5 Cavendish-place, W.
Vesey, T. A., M.D., West-view, Rosteon, Co. Down.
Venning, Edgecombe, 1st Life Guards, 24 Belgrave-square, S.W.
Wadham, W., M.D., 12 Park-lane, W.
Wall, Cavendish L., 5 Addison-road, Kensington, W.
Warden, C., M.D., 39 Temple-street, Birmingham.
Warwick, W. R., Southend.
Webb, F. E., 247 Maida Vale, W.
Welch, C., 33 Ebury-street, S.W.
Wharton, H. S., Gosport.
Whipham, T. T., M.B., Mount-street, Grosvenor-square, W.
White, A. D., M.D., 56 Chancery-lane, W.C.
Wickham, J. C., Hill House, Tetbury, Gloucestershire.
Wilks, S., M.D., 77 Grosvenor-street, W.
Williams, C. T., M.D., 78 Park-street, Grosvenor-square, W.
Willis, J. H., Lewdown, Exeter.
Wilson, E. T., M.D., 6 Montpellier-terrace, Cheltenham.
Wilson, R., 41 Watergate, Grantham.
Wintle, R. P., 4 Warwick-gardens, Kensington, W.
Wood Medical Journal Club, Philadelphia, U.S., per Mr. Stevens,
17 Henrietta-street, Covent-garden, W. C.



CONTENTS.

	PAGE
I. Jottings from Clinical Practice. By H. W. FULLER, M.D.	1
On Valvular Murmurs.	
Paracentesis Thoracis.	
Queries respecting so-called Uræmia.	
Calabar Bean as a Remedy in Chorea.	
Osteo-arthritis, or so-called Rheumatic Gout; its analogies, natural affinities, and antagonisms.	
The Secretions as Guides to Treatment.	
II. The Effects of Overwork and Strain on the Heart and great Blood-vessels. With illustrative Tracings. By T. CLIFFORD ALLBUTT, M.D.	23
III. On Scarlet Fever. By E. COPEMAN, M.D.	55
IV. Cases of Accidental Poisoning. By C. PAGET BLAKE, M.D.	69
V. The Modern Treatment of Syphilis; based on the Evidence adduced before the Committee appointed to inquire into the Pathology and Treatment of the Venereal Disease, published in 1867. By EDGECOMBE VENNING, Esq.	77
VI. On Scrofula. By J. WARRINGTON HAWARD, Esq.	99
VII. On Recurrent Insanity. By G. FIELDING BLANDFORD, M.D.	111
VIII. On Distrain of the Heart. By REGINALD THOMPSON, M.D.	119
IX. Labio-glosso-laryngeal Paralysis. By W. B. CHEADLE, M.D.	123
X. On the Etiology of Pneumonia. By OCTAVIUS STURGES, M.D.	135
XI. On Ankylosis. By B. E. BRODHURST, Esq.	149
XII. Observations on Scarlet Fever, especially with reference to its Epidemic Character. By A. W. BARCLAY, M.D.	167
XIII. On the relative Influence of Bread, Honey, and Sugar upon the amount of Urea and Sugar excreted in Diabetes. By W. WADHAM, M.D.	193
XIV. On the recent Outbreak of Smallpox at St. George's Hospital. By T. JONES, M.D.	229
XV. Results of Vaccination in St. George's Hospital. By R. WILSON, Esq.	243
VOL. V.	A

	PAGE
XVI. Results of Vaccination in the 1st Regiment of Life-Guards. By EDGECOMBE VENNING, Esq.	247
XVII. Annual Report of Medical Cases during the Year 1869. By REGINALD E. THOMPSON, M.D., Medical Registrar	249
XVIII. Annual Report of Surgical Cases during the Year 1869. By WILLIAM LEIGH, Esq., Surgical Registrar	268
XIX. Ophthalmic Report from December 1868 to July 1870. By H. POWER, Esq.	315
XX. Ophthalmic Report from October 1870 to February 1871. By R. BRUDENELL CARTER, Esq.	341
XXI. Notes taken in a German Feld-Lazareth. By W. EWART, Esq. (Student of the Hospital)	365
Index	381

ST. GEORGE'S HOSPITAL REPORTS.

JOTTINGS FROM CLINICAL PRACTICE.

On Valvular Murmurs.

It is not long since the doctrine was universally taught, that a valvular murmur indicates disease or organic change of an irremediable character in the valvular apparatus of the heart. After a time this lesson was considerably modified, and we were led to discriminate between murmurs dependent on organic changes in the valves themselves and those produced by mere functional causes—by an altered condition or impoverishment of the blood, or by irregular contraction of the vessels. The term functional was still confined to certain soft systolic murmurs at the base of the heart, which could be traced more readily along the pulmonary artery than along the track of the aorta. Of late years observation has led to the belief that the range of the term functional must be greatly extended, and may be strictly applied to murmurs at the apex of the heart, as well as to those already referred to at the base. In many instances of chorea, for instance, a temporary systolic mitral murmur is frequently met with; and the constant concurrence of such murmurs with a disorder characterised by irregular and spasmodic muscular action, led me to suggest that their existence is attributable to some irregular or imperfect action of the valvular apparatus*—a view, I believe, which is now very generally

* See my work on *Diseases of the Heart and great Vessels*, p. 47.

adopted. But I am satisfied that the term functional, as applied to valvular murmurs, requires still farther extension, and that cases of functional disturbance of the heart's action sometimes occur accompanied by intense murmur, which in the closest manner simulates serious organic valvular mischief.

Many of you will remember a case in point which occurred in the Queen's ward about two years ago. The patient, a young woman, Mary Ann W., æt. 23, was admitted on March 12, 1868, complaining of severe and incessant palpitation, with consequent dyspnoea. The heart's action was turbulent; its impulse was greatly increased; a loud rough systolic murmur was audible at the apex, and a systolic and slight regurgitant murmur at the base. The impulse of the heart was so violent, its action was so turbulent, and the murmurs were so intense, that if much febrile disturbance had existed, it would have been difficult to avoid the conclusion that the symptoms were referable to acute endocarditis. For some days the symptoms continued unabated, and the girl's suffering from palpitation was very great; but under the influence of the tincture of the *veratrum viride*, the palpitation ultimately subsided, the murmurs ceased, the heart's action became quite tranquil and natural, and she left the Hospital. On the 22d of July 1868 she was re-admitted under the care of my colleague Dr. Wadham, not this time suffering from her heart. Indeed, the heart's action was quite normal, and the sounds were free from murmur; so that Dr. Wadham could hardly believe that only a few weeks previously the heart's action had been turbulent, its impulse excessive, and its sounds accompanied by loud systolic and diastolic murmurs. However, before she had been long in the Hospital, her former heart-symptoms recurred, and with them the same loud systolic and diastolic murmurs, which, as on the former occasion, entirely disappeared before she left the Hospital. In private practice I have met with two similar cases, and I suspect they are more common than is usually supposed. Their true character is often overlooked, and doubtless their diagnosis is somewhat difficult; nevertheless, it may be arrived at with

tolerable certainty, if all the circumstances of the case are taken into consideration. It has been thought that the position of the murmur itself might afford a clue to its functional origin, for in some instances the murmur has been louder and more distinct over the ventricle of the heart than it has at its apex. But this sometimes holds good of organic murmurs, and therefore is not to be relied on. More certain evidence is to be derived from the position of the heart, and the general history of the case. Though the action of the heart is so forcible and turbulent, its apex beats in its natural position, there is an absence of any history of former cardiac disease, and there is little or no febrile disturbance. These are the characteristic and diagnostic features of the disorder. If the murmurs were attributable to old-standing valvular mischief, the heart would be enlarged, and its apex would be felt pulsating lower than usual in the chest; if it was due to mischief of only a few weeks' or a few months' standing, the apex-beat might not be greatly lower than natural, but there would probably be a history of antecedent febrile disturbance, with dyspnoea, palpitation, and præcordial pain; whilst if occasioned by existing acute disease, the usual train of febrile symptoms would be strongly marked. It is possible to conceive a combination of circumstances which would render a correct diagnosis almost impossible; but ordinarily the features already referred to would at least suffice to excite suspicion as to the functional nature of the disorder, and should lead to caution in giving an unfavourable diagnosis.

There is another point to which I would refer in relation to valvular murmurs. I allude to the pathological significance of murmurs undoubtedly of organic origin. Briefly, I would have you clearly understand that it is simply impossible from one examination to judge of the pathological significance of an existing murmur. The importance of any murmur is strictly proportioned to the amount of obstruction which the mischief in which it originates offers to the onward current of the blood, and of this no single examination will enable you to judge. The turbulence or irregularity of the heart's action, the force

of its impulse, the loudness, harshness, or roughness of any murmur, and its position, whether at the base or apex of the heart, do not, even when viewed together, afford a certain criterion as to the existence of organic valvular disease, and still less do they justify any positive diagnosis as to the extent of that mischief, or any prognosis as to the rapidity with which it is likely to run its course. These are points which can only be judged of by repeated examinations conducted at long intervals. A minute bead of fibrin may be so placed at the edge or on the ventricular surface of the valve, as to give rise to a sharp eddy productive of a loud, rough, and persistent murmur, and yet may not offer any serious impediment to the onward flow of blood; whereas in another instance the valvular apparatus may be damaged in such a way as to cause very little eddy in the current of the blood, and consequently to produce very slight murmur, and yet may seriously obstruct the onward flow of blood, and thus may lead rapidly to hypertrophy and dilatation. Be careful, then, not to be over-hasty in forming a conclusion as to the significance even of organic valvular murmur, and be still more so in expressing any prognosis in the case. Content yourselves by stating that organic valvular mischief exists, but that its real practical significance can only be ascertained by repeated examinations conducted at long intervals. If at the expiration of a twelvemonth from the date of the first examination, you find the heart's action quiet and regular, and the apex-beat in its normal position, depend on it there is no serious impediment to the circulation, however loud and rough the murmur, and your prognosis need not be very unfavourable. This would hold good even more fully if the parts remained in the same condition after the lapse of another six or twelve months. If, on the other hand, the heart were to show signs of enlargement, if its impulse had become more forcible, and its apex-beat lower, your prognosis, however slight and soft and apparently unimportant the murmur, could not be otherwise than unfavourable. Several of the former class of cases have come under my observation, in which a loud murmur has existed for periods varying from

ten to twenty years, and in which even now very slight hypertrophy or dilatation of the heart has occurred.

There is yet another point in relation to valvular murmur to which I would beg your earnest attention. I mean, the degree to which the lesions on which these murmurs depend will sometimes admit of repair, when the patient is placed under favourable circumstances. I press this upon you the more earnestly, because, from the very nature of the case, you are unable here in hospital practice to observe the fact for yourselves, and you must take it therefore on my authority. Reparative action, in these forms of disease, takes place very slowly, and hospital patients do not remain long enough under inspection to enable you to trace its various steps. But it does take place to a remarkable degree—to a degree far greater than is commonly supposed. Let me give you one example. In the year 1865 I was consulted about a young man, æt. 17, who had suffered from rheumatic fever at the age of 15, and again a twelvemonth afterwards; on which last occasion he was reported to have had inflammation of the heart. When first brought to me, he was suffering severely from palpitation, with a heaving impulse of the heart visible through his clothes, and an extremely loud and rough systolic mitral murmur. His father was aware of his son's condition; for his medical attendant had told him that the heart was irretrievably damaged, and that dropsy was the inevitable result. I so far confirmed this gentleman's opinion as to tell the father that the mitral valve was damaged, and that unless the mischief were to subside under treatment, the case would probably terminate fatally at no distant date. But having said thus much, I told him that as the apex of the heart was beating almost in its natural position, there were fair grounds for hoping that the mischief was not so serious as the physical signs appeared to indicate, and that treatment might be productive of real benefit; and I instanced several cases of partial or complete repair which I had met with in practice. Farther, I entreated the father not to regard the case as hopeless, but to do all that was necessary to give his son a chance of recovery. I explained that com-

plete rest, with freedom from excitement, for two or three years, was absolutely essential, as was also a long-continued course of iron, together with cardiac sedatives; and that throughout the period of treatment the utmost care would be needed to regulate the secretions, and avoid a recurrence of rheumatism. My injunctions were faithfully carried out by both father and son, and my patient was brought to me every three months, that I might caution or encourage him, if encouragement or warning were necessary, and that I might also note the progress of events. Before the end of a twelvemonth considerable improvement had taken place; and when he came to me last March for a certificate of health, with a view to a public appointment, the heart's action was so quiet and regular, the apex beat so nearly in its normal position, and the murmur so faintly audible, that I verily believe the disease would have escaped detection except under the closest examination.

Let me beg of you, then, not to be over-hasty in hazarding a prognosis when you are called to a patient suffering from valvular disease of the heart. Several examinations, conducted at considerable intervals, will often be needed to determine with certainty whether a murmur is organic or functional; and even when a decision on this point has been arrived at, the true bearing of the murmur, and the practical importance of the lesion which the murmur denotes—the degree to which it interferes with the circulation, and the rapidity, therefore, with which it will induce hypertrophy and dilatation, and lead to dropsy, dyspnoea, and death—are only to be ascertained even approximately by carefully noting the condition of the heart as regards its sounds, its impulse, and the position of its apex-beat, at several examinations, conducted at intervals of three or four months. If after some months of observation, the impulse of the heart becomes more forcible, and the apex-beat lower in the chest, the prognosis ought to be more unfavourable than the mere character of the murmur may have seemed at first to warrant; whereas if an opposite tendency is observed—if at each successive examination the turbulence of the

heart's action and the force of its impulse are found to be lessening, and the loudness and roughness of the murmur to be diminishing; and if, farther, the apex continues to pulsate almost in its natural position—the opinion may be given, that the obstruction to the circulation is not great, and probably will not tend, rapidly at least, to a fatal issue; nay more, that if due caution be taken, repair may possibly be effected to a very great extent, and that the patient may live through a long series of years in the enjoyment of very tolerable health.

Paracentesis Thoracis.

There is no disease in the treatment of which greater advances have been made within the last twenty-five years than in that of pleurisy. Putting aside for the moment the medication and general management of the patient during the acute stage of the disorder, which in the present day is less depressing and better calculated to subdue morbid action and promote reparation of tissue than that which was formerly pursued, I would call your attention to the treatment of pleuritic effusion, when, either from the urgency of the dyspnoea which it occasions, or from our apparent failure to produce absorption of the fluid through the agency of medicine, some other and more speedy method of affording relief is obviously desirable. So lately as when I held the office of Medical Registrar at this Hospital, paracentesis thoracis was rarely practised—never except when the grooved needle showed that the effusion was purulent. Even then the operation was usually delayed until the last—until emaciation and hectic had almost reached their extreme limit and it was obvious that, if left any longer unrelieved, the patient must soon succumb to his malady. It is needless to add that, in the vast majority of instances, the operation, when performed under these circumstances, failed in its object. Weakened by long-continued illness, the patient could ill bear the drain on his strength necessarily engendered by the opening of what was nothing less than a huge abscess; and after a week or two of fruitless struggle, he almost invariably sank from exhaustion. Nowadays the folly of unduly deferring the operation is

clearly recognised, and the tendency is to operate prematurely, before the improbability of producing absorption of the fluid has been ascertained, rather than to subject the patient to unnecessary delay. But there are certain points relative to the operation about which even now erroneous notions are entertained. The fallacious dread as to the admission of air into the pleural cavity which formerly exercised such a pernicious sway as almost to preclude the operation of paracentesis, even now often leads to the failure of the operation. Under the impression that the momentary admission of air will set up fresh inflammatory action in the pleura, or will injuriously modify existing inflammation, mechanical contrivances of various kinds have been employed to draw off the fluid from the chest without admitting air. The chest has been tapped under water; elastic tubes have been attached to the canula, and made to terminate under water; air-tight elastic bags have been attached to the canula—and various syringes have been made use of connected with an elaborate system of stop-cocks. But whatever their form or precise character, they have one object in common, namely, to prevent the admission of air; and their advocates have asserted, not only that they effect their object, but that the chest may be readily emptied of its fluid contents by their agency. My objections to their use are both practical and theoretical. I object to their employment, 1st, because they are unnecessary, and complicate a very simple and harmless operation; 2d, because the admission of air during the process of tapping causes no injury to the patient; 3d, because it is impossible by any contrivance to prevent the admission of a certain quantity of air during the withdrawal of the canula—and therefore, even on theoretical grounds, there can be no valid reason against the admission of a larger quantity; 4th, because they mostly occasion unnecessary pain, and when suction-syringes are employed, a forcible strain is put on the parts, which is not only felt and complained of by the patient, but in some instances sets up fresh and serious local inflammation; 5th, because, although a certain quantity of fluid may be drawn off, it is physically

impossible to *empty* the chest by their agency; and observation at the bedside has convinced me, that recovery takes place less frequently when a small quantity only of the fluid is drawn off than when the chest is thoroughly emptied. On one of these points only will I make any farther remark, viz. the impossibility in most instances of emptying the chest without the admission of air. When effusion into the chest has taken place rapidly, and tapping is had recourse to early, while the lung is still capable of expanding freely, it might be possible to evacuate the fluid contents of the chest without admitting air, if only some mechanical means could be devised for the purpose. In the case here suggested the lung would expand to fill up the space previously occupied by the fluid. But in many instances which occur in practice the pleurisy is of old standing; the lung has been compressed by fluid for weeks or even months; it is carnified and incapable of speedy expansion; in many instances it is so bound down by firm adhesions, that expansion can only be brought about by the natural inspiratory efforts, after a period of many months. In these cases, which are very numerous, it is simply impossible, whether by a suction-syringe or by any other means, to draw off more than a small proportion of the fluid without the admission of air. The chest is a closed cavity, like a cask; and just as it is impossible to empty a cask by tapping it without admitting air, so also is it in respect to the chest. The only difference between the two cases is occasioned by the rigidity of the walls of the cavity in the one case, and by their pliability and yielding character in the other. The walls of the cask being rigid, its fluid contents will run out only to the extent to which air can find admission to supply their place; whereas the walls of the pleural cavity will yield in some measure, to supply the place of fluid which is drawn off. The chest-walls will fall in, the diaphragm will rise, the mediastinum will encroach on the affected side; and up to the point to which they are capable of yielding there is no necessity for the admission of air, inasmuch as by their displacement the space previously occupied by the fluid which is drawn off is at

once filled up. But, provided the lung is permanently or even temporarily incapable of expanding, it is physically certain that, without the admission of air, the fluid contents of the pleural cavity can only be drawn off to the extent to which the walls of the cavity are capable of falling in to supply the place of the fluid withdrawn. If, in contravention of this physical law, an attempt is made by forcible suction-syringes to draw off still more of the fluid, injury to the patient must ensue; for there must be a forcible dragging and stretching of the walls of the chest, or of the lung itself, corresponding to the extra amount of fluid withdrawn. And as all mechanical violence is necessarily hurtful, it is obvious that in using forcible suction a considerable risk of injuring the patient is incurred, without the slightest corresponding advantage.

Thus, then, I come to the conclusion, on theoretical grounds, that all mechanical contrivances devised to exclude air, or to exercise forcible suction of the fluid contents of the chest, are useless, or worse than useless; and this conclusion has been confirmed by my bedside experience; for I have seen patients injured in this manner. On the other hand, I maintain that the temporary admission of air is of little or no importance; and that if only a free opening is made into the lower part of the chest, whether by a full-sized trochar or a scalpel, the operation of tapping is a simple one, and almost uniformly successful.

From the time of my appointment as physician to St. George's Hospital, I have tapped every case of pleurisy, which has come under my care, in which, either from the urgency of the symptoms or the difficulty experienced in producing absorption of the fluid, recourse to more active measures seemed desirable; and out of the large number of cases in which tapping has been performed, one only has proved fatal. Within the last six months you have seen four of my cases tapped; no attempt was made to exclude the air during the operation, and yet you know how rapidly and satisfactorily they all recovered.

My advice, then, founded on large bedside experience,

may be summarised thus: 1st, tap whenever dyspnoea is very urgent, or as soon as it becomes evident that remedies fail to produce absorption of the fluid in the chest; 2d, tap as low down as possible, and make a free opening, allowing the chest to empty itself thoroughly; 3d, so far as possible, avoid causing any local irritation; 4th, if the fluid withdrawn is serous or sero-sanguineous, close the opening with carbolic plaster as soon as the operation is concluded; if, on the contrary, the fluid is purulent, adopt some means to prevent the wound from closing, and take care that the matter is allowed to drain off as fast as it is formed; 5th, after the operation support the patient by bark and good nourishment, and for a day or two give him opium if necessary.

Queries respecting so-called Uræmia.

In acute congestion of the kidneys, epileptiform seizures and other symptoms of so-called uræmia are not unfrequent; and the same holds good respecting chronic Bright's disease. In such cases the amount of urea excreted by the kidneys is far below the normal standard, but nevertheless is often considerable. If the non-excretion of urea is the true and only cause of so-called uræmic symptoms, how is it that coma and convulsions are not present in numberless cases of dwindled granular kidneys, in which the specific gravity of the urine often ranges for years together between 1001 and 1003, and in which therefore the excretion of urea by the kidneys is reduced to a minimum? Again: how is it that persons in whom total suppression of urine occurs, and in whom therefore the excretion of urea through its natural channel is absolutely arrested, not unfrequently go on for a week or ten days without the slightest cerebral disturbance? Such instances are not to be explained by the draining off of the urea by the bowels, for ordinarily the secretion from the bowels is not excessive, nor in any respect abnormal; neither is it to be explained by vicarious action of the skin, for very commonly the skin is dry and inactive. Within the last two months I have seen a case with Dr. Playne of Maidenhead, in

which a child of fifteen, suffering from scarlatina, had complete suppression of urine for eight days; and yet, with a dry hot skin and only a natural action of the bowels, she not only did not exhibit any symptoms of uræmic coma, or convulsion, but retained full possession of her mental faculties to the last.

Again: if so-called uræmic symptoms were due solely to the presence of urea in the blood, how does it happen that a person ever recovers who has once manifested symptoms of uræmic poisoning, including convulsions and coma? During the fit and subsequent insensibility, the secretions, if not extremely scanty, are certainly not more profuse than before the attack; and presumably, therefore, the quantity of urea in the blood must be as large at the termination of the seizure as it was before the fits commenced. Nevertheless, patients emerge from a long succession of these epileptiform seizures, and remain for months or even years without any farther attack, although the secretions from the skin, the bowels, and the kidneys continue in precisely the same condition as before the seizure.

Let us, then, look the difficulty in the face, and endeavour to explain it. It is obvious that the non-excretion of urea is in some way connected with the symptoms of so-called uræmic poisoning, inasmuch as they occur only when the secreting power of the kidneys is interfered with; but it is equally obvious that some other factor is necessary to their production, and this is what requires investigation. Until it is clearly understood and taught that so-called uræmic symptoms are not due solely to the presence of urea in the blood, there is little chance of any investigation which is calculated to shed light upon this dark corner of pathology.

Calabar Bean as a Remedy in Chorea.

In the *Lancet* for 1865 Dr. Maclaurin of Greenwich reported a case of chorea successfully treated by Calabar bean; and on January 13th, 1866, Dr. John W. Ogle recorded in the *Medical Times and Gazette* two instances in which the same remedy appeared to exert a curative

influence. As these were the first, and, as far as I am aware, the only occasions on which the drug had then been exhibited as a remedy for chorea, it occurred to me that before accepting the favourable conclusions to which those three cases pointed, it would be advisable to follow up the experiment so begun, with the view of ascertaining whether the drug was indeed what it appeared to be, namely, a valuable remedy in this troublesome disorder. The results of my experience, I regret to say, have not confirmed the newly acquired reputation of the drug. I gave the bean in the form of tincture to seven consecutive cases, which were all of average severity. The drug was administered alone, the dose at the commencement being $\mathfrak{m}\mathfrak{x}$. of the tincture* mixed with an ounce and a half of water. This was usually given three times, but in two instances four times a day, and the dose was increased gradually but rapidly, usually by about $\mathfrak{m}\mathfrak{v}$. every second day, until a point was reached at which the characteristic poisonous effects of the bean began to manifest themselves. The pulse became accelerated, feverishness supervened, loss of appetite and vomiting ensued, and uneasy sensations were complained of in the head. A drachm and a half or two drachms of the tincture taken three times a day usually sufficed to induce these symptoms. Beyond this, however, no appreciable effect was observed. There was no evidence of the cumulative action of the drug; the drug did not appear to influence the secretions; it did not materially affect the pupils; and it certainly did not exercise the slightest influence over the disease. Thus I am forced to the conclusion, that whatever other claims the physostigma may have to be regarded as a valuable internal remedy, it has none as a curative agent in chorea; and that the improvement which was observed to follow its administration in the two or three cases previously recorded, resulted probably from the careful regulation of the diet and the general improvement of the health which accompanied the patients' residence in hospital.

* Made by macerating $\mathfrak{3j}$. of the powdered bean in $\mathfrak{3j}$. of rectified spirit.

Osteo-Arthritis, or so-called Rheumatic Gout; its analogies, natural affinities, and antagonisms.

There are no safer means of estimating the true nature of a disorder than by tracing the analogies which it offers to other forms of disease, the affinities which it displays, and the antagonism which its existence seems to present to the inroad of other forms of complaint. This holds good in a remarkable degree in respect to osteo-arthritis, or so-called rheumatic gout. The similarity of its general symptoms to those of well-known constitutional disorders is too obvious to require specific mention, and the close analogy of its local symptoms to those of scrofulous disease of the joints has been ably pointed out by Dr. Collis of Dublin, and by the late Dr. Todd, who remarks: 'In malignant disease of the joints and in strumous affections of them, both connected with constitutional taint, there is the same tendency to the formation of exuberant osseous growths around the joints, while the articular structures within are suffering destruction and decay.*' But though the analogy which its local symptoms bear to scrofulous disease of the joints has been pointed out, its natural affinities and its strange yet well-marked antagonisms appear almost to have escaped recognition. Nevertheless they are remarkably striking and instructive. So close is its affinity to phthisis pulmonalis, that out of four hundred and seventy-six patients whose history I have carefully investigated, no less than one hundred and ninety-six, or 40·3 per cent, belonged to decidedly consumptive families, and had lost a father, mother, brother, or sister, from the effects of pulmonary disease. Yet, notwithstanding the strongly marked hereditary tendency to pulmonary disorder in the families of those who suffer from rheumatic gout, the antagonism to phthisis, which results from the existence of osteo-arthritis, is most remarkable. In the whole course of my experience I have only known five persons die of consumption whose joints have been distorted by osteo-arthritis, and in all those five the active symptoms of the articular disease had

* *On Rheumatism*, p. 169.

long subsided before the pulmonary disorder commenced. In other words, the tendency to osteo-arthritis was replaced by the tendency to phthisis, and did not run on concurrently with it.

The antagonism of osteo-arthritis to albuminuria is even more striking. I examine the urine of every patient who consults me in private practice, and thus can testify to the condition of the urine in many hundred cases of rheumatic gout; but I have never met with an instance of albuminuria associated with this form of articular disease. This is the more remarkable from the fact that albuminuria, to a greater or less extent, is met with in nearly 25 per cent of all cases of acute disease, and in a considerable proportion of chronic disorders; and may be regarded almost as the natural accompaniment of old cases of chronic gout, in which deposits of urate of soda have taken place in the joints—cases which are too often confounded with osteo-arthritis, in consequence of the distortion of the joints which accompanies the latter form of disease. Indeed the contrast afforded by the condition of the urine in cases of osteo-arthritis and in those of chronic gout may often serve as a means of diagnosis between the two disorders. In the one the urine is usually of normal specific gravity, and never albuminous; whereas in the other the specific gravity is usually much below the normal standard, the presence of albumen is not uncommon, and when chalk-stones are present is almost constant.

Thus, then, on reviewing the history of rheumatic gout, it is impossible to avoid the conclusion, that the disease, like phthisis pulmonalis, results from a form of mal-assimilation in some way connected with a depressed state of vitality. The causes which usually conduce to its inroad, and which invariably aggravate its symptoms, are all of a depressing nature; many of its more characteristic features point unmistakably to a low state of vitality; whilst its close affinity to phthisis, and the peculiar character of the changes which it induces in the joints—changes which approximate, in many respects, to those which result from strumous and malignant

disease—serve to indicate a depressed condition of the general health. It is needless to add, that the result of treatment confirms the impression thus derived from the history of the disorder. You are all aware that I never treat it as a form either of gout or rheumatism, and do not employ colchicum, alkalies, or other of the so-called specifics for those complaints; inasmuch as they only tend to depress the patient, and hasten the onward progress of his malady. Even in the acute form of the disorder—when the patient is usually bedewed with perspiration, and declares that it is agony to move—I order him to leave the bed, with the view of getting rid of the relaxing influence which tends to keep up the enfeebling perspiration. If that step does not suffice to check the sweating, I prescribe a cold shower-bath or the dripping-sheet, and at the same time administer the mineral acids and vegetable tonics, with cod-liver oil and a generous diet; and, provided the urine remains clear after standing, I do not hesitate to prescribe iron, and to allow a fair quantity of wine, beer, or porter.

As you have all seen the benefit which results from this treatment, it is needless to do more than beg you to be resolute in insisting on its adoption; for the prejudice of mankind is very strong against any treatment in which warmth does not play a conspicuous part; and in private practice all the tact you possess will be required to get your instructions properly carried out. I do not hesitate to say, that there are thousands of persons more or less crippled by rheumatic gout who would have been in full possession of their powers of locomotion if a tonic and bracing system of treatment had been adopted when they were first attacked.

The strange antagonism of osteo-arthritis to albuminuria deserves the closest investigation. At present I can do little more than record the fact; but it seems probable that with the progress of chemical and other methods of investigation, the cause of this antagonism may be discovered, and that light may thus be shed upon the pathology both of albuminuria and osteo-arthritis.

The Secretions as Guides to Treatment.

There is no point on which the failure of treatment so frequently depends as upon a neglect to investigate the character of the secretions, and to prescribe according to their monitions. Nowadays we meet with far fewer instances of mistaken diagnosis than of misdirected treatment. It is the fashion or the folly of the age to regard the diagnosis of disease as infinitely more important than a knowledge of how to treat and relieve it; and those who would blush at their inability to describe the precise nature of any disorder, and of the causes which are supposed to produce it, think little of their inability to check its progress. It is not surprising, therefore, that little heed is too often paid to the secretions—the landmarks which guided our forefathers to successful practice—or that cases should frequently come before us in the wards in which, for lack of a due recognition of these landmarks, the treatment which has been adopted has utterly failed. Let me take as an example the case of a man at present in the Cambridge ward, who was admitted suffering from anasarca, occasioned by a weak and dilated heart. In addition to extensive dropsy of the extremities, he had urgent dyspnoea with orthopnoea, congestion of the lungs, effusion into the pleural cavity, engorgement of the liver, with pale-coloured faecal evacuations, and scanty, loaded, non-albuminous urine, tympanitic distension of the abdomen, and slight effusion into the abdominal cavity—the ordinary assemblage of symptoms which result from long-continued interference with the central organ of the circulation. Before I saw him he had taken salines with digitalis, squills, scoparium, and other diuretics; but his urine had not increased in quantity, and his symptoms had been gradually increasing in severity. This was his condition when he was admitted into the Hospital. Having regard to the pale colour of his motions, I felt convinced that no real good could be effected unless a free flow of bile could be induced; and that the failure of the treatment he had undergone before admission into the Hospital depended principally, if not solely, upon the neglect to stimulate

the action of the liver and the secreting apparatus of the bowels. I therefore prescribed five grains of the compound digitalis pill—containing three grains of blue pill, a grain of squills, and half a grain of digitalis—three times a day; and within three days he had begun to improve. Before the end of a week the motions had assumed a healthy colour, the quantity of urine was trebled, the flatulence had almost disappeared, the anasarca was rapidly decreasing, and the dyspnoea subsiding. Indeed, it was obvious that the very medicines which before had proved inoperative had become active agents for good as soon as the secreting apparatus of the liver and bowels had been stimulated to healthy action.

Take another class of cases. It sometimes happens that patients are admitted suffering from ague, with which they have been afflicted for many weeks. They have taken quinine perseveringly, but have not obtained relief. On examination, the case is at once apparent. Their internal organs are in a state of engorgement, and consequently are sluggish; their bowels are costive, and their motions unhealthy. In these cases, the administration of remedies calculated to stimulate the viscera to action is all that is needed to restore them to health. Two or three doses of colocynth and rhubarb in combination with quinine will at once arrest the disease, which weeks of mere quinine-taking had failed even to control.

In many forms of dyspepsia the same holds good. The secretions of the stomach and bowels are disordered, the liver is gorged, and the tongue is covered with a yellow fur. The patient has been purged by means of senna, colocynth, or rhubarb; alkalies and alkaline earths, together with vegetable bitters, have been given; possibly the mineral acids have also been tried; moderately strict dieting has been had recourse to; and other expedients have been adopted; but in vain. The disagreeable taste in the mouth, the acidity, waterbrash, flatulence, drowsiness after meals, and restlessness at night, continue unabated. And what is the cause of this failure of treatment? Though the bowels act regularly, the motions are pale and lumpy, or else dark-coloured and offensive; and

the urine is scanty, high-coloured, and loaded with lithates. Cases such as these often come before us in the wards, and occur still more frequently in private consulting practice. They convey a lesson which must not be forgotten, even though healthy, dogs with artificially-made biliary fistulæ do not appear to secrete an increased quantity of bile under the influence of moderate doses of calomel. The lesson which they teach, and which you will do well to remember, is, that so long as the secretory apparatus is inactive or out of order, the remedies which are ordinarily most efficacious in relieving the symptoms of dyspepsia are of little avail; whereas they exert their beneficial influence directly that disorder is rectified, and secretion is reëstablished. In cases such as these, a few doses of calomel, combined with opium if necessary, will in a few days effect a change for the better, which cannot be brought about by other means in as many weeks. Under their influence the motions will lose their offensive odour, and assume a healthy colour, the tongue will clean, the urine will become clear, the symptoms of acidity and discomfort will pass off; and your patient will give you credit for affording him relief. When this healthy condition of the secretions has been attained, you need have little anxiety as to your patient's recovery, for the remedies which had previously proved ineffective will speedily quiet the irritability of the stomach, increase its tone, and restore your patient to health.

Let me take yet one more class of cases—the most common perhaps with which we have to do, and that in which, perhaps more than in any other, a want of proper regard to the secretions leads inevitably to unsuccessful practice. I refer to cases of so-called debility, in which stimulants, high feeding, and tonics are constantly recommended, and are often fruitlessly had recourse to. The cases to which these observations apply are of every imaginable description. In private practice, it often happens that a person, not otherwise out of health, is accidentally deprived of his usual exercise; and, his appetite being unimpaired, he takes more food than is absolutely required for the repair of his body. The wear and tear of his tis-

sues being much less than usual, owing to his inactivity, and the supply of fresh materials, owing to his unimpaired appetite, being in excess of the actual requirements of the body, one of two things must necessarily happen: either his excretory organs must do an unusual amount of work, and throw out of the system the whole of the matters which have been taken in excess of the actual requirements of the tissues, or the surplus materials must accumulate in the blood, alter its quality, and oppress the nervous system. The alternative is not doubtful. When the blood is surcharged with materials which, however good and nutritious, are yet in excess of the requirements of nutrition, the nervous centres are oppressed; and not only does languor, or general debility, as it is termed, occur, but the liver, kidneys, and other secretory organs become gorged and sluggish, the urine becomes scanty, and the motions become clay-coloured, or else dark and offensive. In private practice, cases such as these are constantly met with, in which, notwithstanding the unhealthy state of the secretions, tonics have been given for months, together with stimulants and every variety of strong food, and in which a few days of active purgation, some alterative doses of mercury, enforced exercise, and a restricted diet, by leading to the elimination of the surplus materials, and so to a purification of the blood, do more than all the previous tonics and rich feeding to put an end to the patient's languor, and restore his physical and mental power. In hospital practice, these particular cases less frequently come before us; but in another form, and under other circumstances, similar instances not unfrequently present themselves. In the Roseberry ward, at the present time, is a stout, strong-looking, hysterical servant-girl, Sarah Fleetwood, suffering from amenorrhœa. She had undergone treatment for a considerable period before admission, and throughout had taken iron in various forms, but had not obtained relief. On admission, she complained of extreme languor and debility, and of utter loss of appetite. Her tongue was clean, and her bowels were said to be regular; but her urine was scanty and loaded with lithates; and on examination her motions proved

to be very scanty, and almost white, lumpy, and offensive, and had been so, according to her account, throughout her illness. She is a perfect type of the class of cases which I have been endeavouring to describe. She is oppressed by the presence in the blood of matters which ought long since to have been eliminated, but which the inactivity of her secretory organs has caused to be retained in the system; weak, in the sense in which a healthy person on the eve of a bilious attack is weak, but in no other; weak from a cause which no strengthening food and no tonics will remove, nay, rather which they will tend to aggravate, and which protracted semi-starvation or the skilled aid of the physician is required to rectify. The iron and other tonics, the port-wine and other stimulants, which the poor girl had taken prior to her admission into the Hospital, only tended still farther to surcharge her system with materials which it was incapable of assimilating—to render her blood more noxious to the brain and other nervous centres, and thus to increase her languor and aggravate her suffering. Yet these very remedies have nearly effected her cure, now that healthy secretion has been reëstablished. Already, under the influence of a few doses of calomel and colocynth, the urine, instead of being scanty and loaded, has become abundant, and in every respect healthy; the motions are no longer pale and lumpy, but have become normal in character; colour has returned to her lips; she sleeps more quietly, feels stronger and less languid; and no longer exhibits a repugnance to food. And now that the iron is able to do its work, its beneficial influence will soon be manifested still more decidedly, and the menstrual discharge will speedily return. In a precisely similar case which I saw with Sir Charles Locock many years ago, the symptoms did not yield until after a protracted course of calomel; and experience justifies me in warning you that in several forms of amenorrhoea, and in many of the so-called cases of general debility, a deranged condition of the alvine secretions lies at the very root of the symptoms, and that all remedies will fail to relieve the patient until steps have been taken to rectify them. Purgation may or may not

be necessary, and the aid of calomel may or may not be needed; but if either or both prove requisite to attain the desired object, they must be used without hesitation. No theoretical considerations must be permitted to counter-vail such clear and unmistakable indications for treatment. Experience confirms what theoretical considerations would lead us to expect, namely, that the true mode of restoring strength, under the conditions we are now considering, is, not by administering food and tonics which the patient is incapable of assimilating and making use of; nor is it by abstaining from administering alterative or aperient remedies, lest by so doing we should weaken the patient—both of which courses can only tend to continued mal-nutrition and a gradually-increasing failure of strength—but rather to endeavour, by appropriate means, and at whatever risk of present discomfort to the patient, to reëstablish healthy secretion; and thus place him in a position to profit by wholesome food, the natural restorative of health and strength.

HENRY W. FULLER, M.D.

II. THE EFFECTS OF OVERWORK AND STRAIN ON THE HEART AND GREAT BLOOD-VESSELS.

DURING the time that I was a student, and afterwards in the earlier days of my practice, I possessed the belief, and, as I thought, the experience supporting the belief, that heart-diseases were due, as a rule, in old people to atheroma, and in young people to rheumatism; also that aneurysm of the aorta was due chiefly, if not exclusively, to constitutional antecedents. No doubt, in the latter case our patients would sometimes tell us of a bodily injury or strain preceding the aneurysm; but no great weight was attached to the statement; and if commented upon at all, it was only to the effect that strain was the determining event following a prevenient degeneration. In the former case, moreover, that of heart-disease, we had certainly to take cognisance of many cases of heart-disease in young people in whom we had no history of antecedent rheumatism, pyæmia, scarlet fever, or such disease; and we accounted for them by the supposition of some 'hereditary tendency' or personal peculiarity. No prominence was ever given to bodily work as a cause of heart-diseases either in the current teaching or in the current text-books of the day. I was therefore somewhat perplexed, when I settled among a heavily labouring population, to find a very large number of heart-cases in young well-made subjects, of healthy build, and previously unaffected by constitutional disease. After a time I became convinced of the part played by mechanical causes in a large number of these patients; and my attention was then given to ascertain how great a part, and of what kind, this is, and how their effects are to be distinguished from those of

constitutional origin. The time has now come when I feel at liberty to publish some general remarks upon this subject, as it has been continually in my thoughts and under my observation for many years. I am perhaps seldom without a case or cases of disease of the heart due to mechanical causes in my wards, and they are constantly the subjects of clinical demonstration; in the dead-house, likewise, I have repeated opportunities of investigating the parts affected, and of making myself familiar with the pathological processes. My views on the matter have undergone little change for the last two or three years, and I expressed them briefly in a communication to the Yorkshire Branch of the British Medical Association at Bradford, about a year ago.

Up to the present time I have preferred working as the facts seemed to lead me, and without seeking help from the literature of the subject. For the purposes of this paper, however, it was desirable that I should find out what has been said on the subject already. But although I knew that the mechanical causation of heart-disease was not familiarly taught, yet I was certainly astonished to find so slight a reference to such causation even in the best of our works on heart-diseases. If I pass by the saving line commonly inserted in the sections on causation of heart-disease and aneurysm, and which serves barely to include 'over-exertion' as one of its causes, I might say safely that this cause is overlooked. Dr. Hope is, comparatively speaking, quite diffuse, when he adds that in his experience he has seen 'over-exertion in rowing' produce mischief in the heart. The only thing I have learnt from my references to about twenty English authorities is the disagreeable fact, that authors have a calm way of reproducing portions of the writings of their predecessors without acknowledgment, and apparently without verification. Nor do I fare better at the hands of foreign writers; with them too the mechanical causation of heart-disease is either omitted, or is treated in a way so meagre as to be worthless. Infinite pains are given to the pathological anatomy of the heart, infinite pains

to the description and classification of morbid sounds. Little, however, is given to the treatment of heart-disease, and little to the investigation of causes other than constitutional inflammations and degenerations. Curious cases are sometimes recorded in which a sudden shock has ruptured a valve; these cases are, however, given as curiosities, and are not regarded as extreme instances of an agency always at work in some degree. One recent and deservedly eminent English author says, indeed, that although examples of valve-rupture are published, yet his belief derived from post-mortem examination is, that rupture of a healthy valve never happens. It does not occur to him that the diseased valve he has before him may owe its disease to the same causes as those to which it owes its rupture. I have recently been made aware, however, that a few writers have had the mechanical causation of heart-disease forced upon their notice in an exceptional way, and these are the medical officers of our army. Their writings are unfortunately hidden away in special reports, unseen by the profession at large; and I am made acquainted with their contents for the first time by the quotations contained in the excellent little book recently published by Mr. Myers, on *Diseases of the Heart among Soldiers* (Churchill, 1870). This book came into my hands when the present paper was ready for the printer; and it is a peculiar satisfaction to me to find that he uses almost the same descriptions and arguments in explanation of heart-disease in the army which I used at the meeting of the branch of the Association at Bradford a year before to explain its frequency among forge-men, colliers, wharfingers, and other persons exposed to the heavy strain of town labour. That this experience of Mr. Myers is almost confined to those physicians who practise in the army, is evident from the following passage in Sir W. Jenner's address delivered to us at our Leeds meeting in 1869. His words, which struck me at the time as opposed to my experience, are as follows: 'We have attained to this practical conclusion, viz. that, regarded in a clinical point of view, struc-

tural changes in the valves of the heart are referable to one of three classes—imperfection in development, acute endocarditis, degenerative changes; and yet farther advance of clinical knowledge has shown that non-fatal acute endocarditis is almost limited to acute rheumatism, and that degenerative changes, sufficient in degree to interfere with function, do not occur in the valves of the heart till middle life, and rarely till advancing life.*

Such is the opinion of this most distinguished physician; an opinion founded upon a long experience of the diseases of the upper classes of society, and of the diseases occurring among the patients of a hospital away from forges, engineering-works, docks, and other places of heavy labour. My experience in Leeds, and in a hospital placed in the midst of such works, is almost precisely the reverse. The heart-diseases due to senile degeneration are, of course, as numerous or more numerous than elsewhere, and seem to come on sooner; but the diseases due to imperfect development are rare; and those due to acute rheumatism are, among young men, fewer than those which I have learned to attribute to over-exertion of the body.

It is my purpose in the present paper to describe first the kind of cases which appear to me to be due to mechanical injuries; taking these not in the order in which I discovered them—for of course I discovered the worst kinds before detecting their insidious beginnings—but in their natural order; secondly, I shall try to show how the agency of mechanical causes accounts for these cases; finally, I shall support my arguments by the experience of other physicians, to which I am now enabled to add the farther evidence collected by Mr. Myers.

It has been interesting to me to assure myself that as I studied these cases of mechanical heart-disease they fell into a very natural class, having well-marked characters among themselves, and presenting unlikenesses to other forms of heart-disease. That a certain hypothesis explains a definite class of facts, and segregates them into a natural group, is but another way of

* This passage in Sir W. Jenner's speech is also quoted by Mr. Myers.

saying that it is true. We have now to examine the facts, and to see how far their evidence goes.

The order in which the chronic morbid changes seem to present themselves for consideration is as follows: 1st, dilatation of the right heart; 2dly, dilatation of the left heart; 3dly, in reason, if not in time, hypertrophy of the left ventricle, or of both ventricles; 4thly, chronic inflammation of the aorta and aortic valves; 5thly, dilatation of the aorta; 6thly, incompetence of the aortic valves; with, 7thly, farther compensatory hypertrophy of the left ventricle; 8thly, loss of compensatory hypertrophy, with consequent rapid failure, and often with consequent mitral regurgitation.

This order of succession may be complete, or may present these variations among others, that, after the fourth stage, the inner coats of the aorta may and often do give way, and dilatation of the aorta is complicated with sacular aneurysm, or aortic incompetence may take place as a primary or as an earlier event. In the former case the course of events is somewhat variable; but we often find, sooner or later, the sixth and seventh changes in association with it. Sometimes aneurysm precedes incompetence or even simple deterioration of the valves; sometimes it appears at the same time; sometimes, but far less often, it occurs subsequently.

I have been fortunate in keeping a large number of these patients upon my books, of watching them week by week for years, and finally of securing post-mortem examinations of their remains. Autopsies, however, in these as in other cases, illustrate the extreme stages for the most part, and we are left to symptoms, to physical signs, and to reason and analogy, for the understanding of the earlier stages.

With regard to the two first stages, simple dilatation and simple hypertrophy, I have little more than the latter kind of evidence to offer. So constantly, however, do I meet with these states of the heart in patients who have been subjected to over-exertion, that I have no hesitation in placing them together as the beginnings of mischief.

Whether dilatation appear alone, or whether the enlargement consist wholly or in part of hypertrophy, depends apparently on several conditions. If the heart over-taxed be a feeble one, we find dilatation of both chambers; if again the patient, though of strong build, be, through carelessness or poverty, deprived of proper nourishment, we find the same thing: if the lungs be small, we find dilatation of the right heart especially: and this, moreover, we find in cases where the lungs, though adequate in size, are hampered in their movements, as in athletes, or soldiers, tightly clothed about the chest, or in labourers whose occupation consists of work, such as lifting of weights and the like, which fixes the walls of the chest and prevents its full expansion. But if, on the other hand, we have to deal with the effects of over-exertion under none of these disadvantageous conditions, if the person be well built and well nourished, if his lungs be of adequate size and have free way to expand in a pure atmosphere, we then may find also enlargement of the heart, probably of both ventricles, but we find hypertrophy in proportion to dilatation. Out of a number of cases I shall select a few examples as illustrations, and must, of course, report these very briefly. Take, for instance, the following case of dilatation, due to small lungs and perhaps to feeble heart combined:

L. A., a tall slight young man, consulted me for palpitation, coming on especially after exertion. He was much devoted to physical exercise, and laboured greatly in gymnastics of many kinds. Like too many courageous men, he worked the harder the more he suffered, believing that 'training' was to be his cure. On stripping him, I found the chest long from above downwards, shallow from behind forwards, and narrow across the front. The intercostal spaces were therefore wide, and the ribs slanting. The expansion of the lungs was but moderate. Here we had to do with small incapacious lungs, which were unable to transfer blood and to carry on increased combustion at the rate required. The heart was excitable, and acted laboriously; its beat was diffused, and was plainly to be seen and felt in the epigastrium. The area of dulness was considerably extended, so that it reached across, or almost across, the sternum. The apex also seemed to be displaced somewhat outwards and downwards, though the actual apex-beat was ill defined. The first sound, though widely audible, was indistinct in tone; the second sound over the aortic valves

was thin, and the pulmonary glands closed with a tense abrupt sound; there was no murmur. The sphygmographic tracing shows the irritable action and high diastolic pressure of the pulse.*



Very different was the state of chest and heart in G. W., a young man, like the former, in the upper class of life, and devoted to physical exercise. He had rowed hard at Oxford. His chest expanded well; the ribs were horizontal, and the intercostal spaces narrow. G. W. suffered from palpitation, increased on exertion; and the heart, in addition to signs of enlargement, as in the former case, presented the slow heave of hypertrophy. I imagine that the heart in this case was dilated on both sides in consequence of over-exertion, and that compensatory hypertrophy had established itself to some extent. The high straight upstroke of the sphygmographic tracing shows the violence of the action; and this was also to be seen in the recoil of the carotids.*



Prolonged rest was of great service in both these cases, especially in the latter one; but such hearts seem generally to take some time to right themselves. In the former case I found great benefit from the prescription of moderate singing, which tended to enlarge the lungs, and thus to help the pulmonary circulation. I had a good instance in my own person of the way in which dilatation of the right heart may be set up during over-exertion.

In the summer of 1868 I began to walk in the Alps a little too soon for good training. After three days' walking on lower levels, but for

* These two tracings are taken actually from Mr. Myers's blocks. My own were in the wood-cutter's hands when I found that two of Mr. Myers's tracings almost exactly resembled them. It was therefore not only unnecessary to recut them, but also I was glad to find my observations so closely in harmony with his. I have to thank Mr. Myers for his prompt kindness in placing his blocks at my disposal. Vide also p. 83.

longish distances, K. and I ascended the Galenstock; and the next day crossed the Ober Aar pass. Instead of starting from the Grimsel, we remained at the Rhone glacier, crossed the Grimsel pass from thence, and ascended the Sidelhorn before settling down to the day's work. At the end of the day again, instead of dropping down on Viesch, we determined to seek the better quarters of the Eggischhorn; and had accordingly to mount that sturdy little alp by a somewhat rapid ascent. Hitherto I had been in good condition; but the new call for combustion to meet the demand for the additional force required to lift eleven stones and a half to a height of, say, two thousand feet, threw a great stress upon the right heart; and I was rather suddenly seized with a strange and peculiar *besoin de respirer*, accompanied by a very distressing sense of distension and pulsation in the epigastrium. On placing my hand over my heart, I felt a labouring diffused beat all over the epigastrium. I at once opened my shirt, and ascertained by percussion that the right ventricle was very greatly dilated. I therefore threw myself at length upon the grass, with my shoulders raised, and had the satisfaction, in a few minutes, of finding the distension, the oppression, and the dulness recede. I was then able to rise and sit down, or even to move about upon the level; but, curiously enough, the instant I began to ascend, the symptoms returned. I was therefore obliged to send K. forward, and proceed myself with great caution. When I got up to the height of the inn, and had only to walk a mile or two on the level by the water-way, I ceased to suffer, as I felt no general fatigue whatever, and was able to dine well on my arrival. In the night, about 3 A.M., I was suddenly awakened by a severe and distressing palpitation in the epigastrium, with great dyspnoea; there was not, however, the same extension of dulness over the sternum. I went to the window and drew a few long respirations, which gave me ease, and I lost my ailment altogether. No doubt the pressure of a full abdomen against the diaphragm, while recumbent, had again embarrassed the over-taxed right ventricle. Christian Almer, to whom I described my symptoms, said that the same thing had occurred occasionally to himself and to other guides when cutting a number of steps on steep slopes.

We may now pass from well-nourished subjects to those who are by carelessness or poverty deprived of food. Among many cases of this kind I find two which were described to me by my friend and former teacher, Dr. Paget of Cambridge. Dr. Paget says in a letter to me:

Two cases are set down in my memory in which dilatation of the heart existed, in a high degree, without valvular disease; and in which I could make out no cause for the disease except the habit of taking long and active exercise fasting. Both the patients were men of active energetic habits and high courage and endurance; both of them were tall and strong; one of them rather stout. They were in the habit of going without food from breakfast until a late dinner. I satisfied myself

that no other cause was assignable except the long-continued exertion and the neglect of due supply of nourishment. . . . I have met with other cases, as you no doubt have, in which what seemed to be a beginning of a like state of the heart has been arrested by the simple expedient of a sandwich-box and a flask.

These interesting remarks of Dr. Paget bear out the view I had long held, that material supplied insufficiently when the demand for combustion is excessive has the same effect upon the right heart as deficiency of lung-extent in proportion to bodily weight. In either case the force needed is not forthcoming, and the blood is returned to the right ventricle, to seek it still in vain.

Take another instance. Runners believe that eating 'spoils the wind,' because digestion, by preventing free descent of the diaphragm, thus diminishes lung-extent. They are likely therefore to go to the other extreme, as was the case with John Ottrick, an out-patient of mine at the Leeds Infirmary. He presented himself in Feb. 1870, and I at once detected the case as one of over-strained heart. My friend Dr. Fothergill was so good to take the man aside, and draw up the following notes for me:

He is a well-made active fellow, æt. 29. He lives two miles from his work, and often runs the whole distance, as he adds the profession of runner to that of dyer. He often runs to Bradford and back, and is thus constantly over-taxing the pulmonary circulation and right ventricle. The physical signs are: venous pulsation and excited action of the heart, especially of the right ventricle. No murmur, pulmonary second sound accentuated; dulness extends from below the fifth rib into the epigastrium and to the right of the sternum. When holding his breath, pulsation is very visible below the ensiform cartilage. P. 84, compressible. On exertion, a slight irregularity of the heart is set up. Symptoms: general health good; but is not well-fed, his wages being low. He is now soon out of wind, and suffers from palpitation. He does not smoke much. Diagnosis: distension of the right ventricle and auricle from long over-taxation.

The sphygmographic tracing was unfortunately not taken until he had been six months under treatment by rest, diet, digitalis, and wild cherry, and had been much relieved. The good living at the Universities, on the other hand, and the care which the men fortunately take of themselves, prevents heart-mischief, and enables them to enjoy physical exertion with all its advantages. Pro-

fessor Humphry holds very decided views on this matter; and I believe I am at liberty to express his opinion that disorders of the heart, as consequences of boating and other exercises, are very rare, and by no means proportionate to the good. The undergraduates, he tells me, are very careful—quite as careful as is compatible with courage and manliness of character. The opinion of Professor Humphry on this matter is very important, derived as it is from an extensive acquaintance, professional and other, with members of the University for more than a quarter of a century. My own acquaintance, which is almost as large among Oxford as Cambridge men, impressed me so strongly in the same direction, that I was thus prejudiced for a while against a recognition of the undoubted evils which arise under other circumstances from these causes. It proves the gratifying fact that good nourishment and intelligent watchfulness can obviate such dangers even in the young tissues of an undergraduate.* But how reckless violence may be contrasted with this is well shown by a case related to me by my former pupil, Mr. Aldridge, now a resident officer under Dr. Crichton Browne at the Wakefield Asylum.

A lunatic woman who had been in the asylum was liable to frequent paroxysms of rage so furious that she would generally nearly choke herself, the face always becoming blue and the veins of the neck greatly distended. One day she actually did choke and die in one of these paroxysms of violence. The only lesion found was in the right ventricle, which was full of blood, was much dilated, and was 'as thin as paper.'

Before passing on from the effects of exertion in distending the chambers of the heart, to investigate its effects upon the valves, I must insert here a quotation from the essay of Mr. Myers. He says (p. 39) of soldiers, that a committee appointed by Government made the following assertion in their report:

'The special heart-disease from which the young soldier suffers is not, we are informed, disease of the valves, but excitability of the heart combined with some but not great enlargement. During rest a heart

* At the same time I am disposed to think that the curable changes I have already described do occur not uncommonly in university men, and are set lightly aside as 'merely functional.'

of this kind beats easily; but on the least exertion its action becomes irregular, and the man becomes breathless.' Mr. Myers says (p. 39): 'Percussion (in this stage) reveals little or no increase of cardiac dullness; the sounds of the heart are short and abrupt, the second being abnormally distinct; the apex-beat is visible below the left nipple, and the pulse is small and very rapid.' Again (p. 50): 'And this hypertrophy, when very marked, and accompanied, as almost invariably it is, with dilatation, becomes itself an accepted disease, and one by which, as already shown, the army suffers great loss.'

I reproduce two of Mr. Myers's sphygmographic tracings taken from soldiers presenting this disorder.



In passing on to valvular sufferings we have to inquire in what relation these stand to the dilatation already described. For my own part, I am satisfied that by sheer stretching of the chambers the auriculo-ventricular valves become incompetent. I disbelieve in Dr. King's 'safety-valve' hypothesis; I have watched quantities of overworked hearts, and I believe tricuspid regurgitation is as truly a disease as mitral regurgitation, though more common, more easily established, less audible, and, in its early stages, less dangerous. Clinical experience and examination of the dead alike assure me of a fact which many readers I know will doubt—namely, that mitral incompetence may and does result from over-distension of the left ventricle. On the other hand, I have never seen evidence

of tricuspid incompetence in hearts assuredly sound, although I have looked for it in scores of labourers and athletes under exertion. Whenever the venous reflux has been distinctly visible, I have been able to recall it quickly in the same persons after long intervals of rest; showing, so far as this symptom has value, that the right auriculo-ventricular orifice is in such persons permanently weakened. Mitral regurgitation is seen less often, because the left ventricle is less frequently over-taxed and is stronger; but out of several cases before me, in which this state of regurgitation was established in the left heart, let me select the following:

Strain on Drill. Dilatation of Heart.—John Rogers, æt. 23; shoemaker, of slight build; said to be temperate and to have enjoyed good health. He never had rheumatism in any form, nor does he smoke much. Has been on drill as a militiaman four times. Went up to drill in April 1870, when in good health. He found the work much harder than before; his clothes were tight, and the cross-belt and straps of knapsack were very confining. He felt this the more, as the drill took place in part up and down a steep hill-side. Many of the men complained of being overdone. He managed to keep up during exercise; but on the first and every subsequent occasion, on coming home and removing his knapsack, he was seized with a violent and distressing fit of coughing, which lasted an hour or more. He never had a cough before. When his time was over, he felt very short of breath and oppressed in the chest, which symptoms, before unknown to him, have grown worse. On examination in Oct. 1870, the heart-beat is much diffused, rather rapid, and excited. The whole heart is much dilated, its dulness extending nearly an inch beyond the sternum, and its sounds are thin and short. There is a systolic murmur heard at the apex, and less loudly over the xiphoid cartilage.

I was struck on hearing this intelligent man's description of the embarrassment caused by his breast-straps, not only because it bore out my own views of the consequences of deficient pulmonary area or of combustive material upon the right chambers of the heart, but also because it reminded me very strongly of a conversation held about a year ago with my friend Prof. Rolleston, who entered with warm interest into my views about heart-work. He especially urged me to remember the provision made in diving animals such as the whale, which animal does not even wear a breast-bone at all, still less a breast-strap. As in diving, however, there is only need for room

to hold the venous blood, and no need for excessive combustion (as in drilling upon a hill-side), the absence of a sternum may be useful in allowing the pressure of the water to squeeze the heart, and so prevent the influx of venous blood. The venous reservoirs in the livers of some seals fulfil the same end in protection of the heart. In John Rogers distension of the heart had resulted in mitral and perhaps in tricuspid regurgitation. Dr. Gairdner has likewise noticed this sequence between the dilatation of the left ventricle and mitral incompetence;* and Dr. Bristowe has written in support of the same view in the *British and Foreign Medico-Chirurgical Review* for 1861, p. 215. Dr. Bristowe, in a paper which is too good to be buried in the back volumes of a magazine, proves, I think satisfactorily, that the incompetence in these cases is not due to a stretching of the orifice so much as to a deterioration in the muscular and tendinous cords of the valves.† This explanation clears up some cases of secondary mitral incompetence which were formerly a puzzle to me, as at the autopsies I had not been able to demonstrate mitral dilatation. I had, indeed, presumed, until I read Dr. Bristowe's paper, that the dilatation was 'occasionally' produced during functional activity, and that the orifice might recover itself when the ventricle was no longer distended. Certainly it is true, but I think hitherto not formally recognised, that mitral regurgitation, or at least the murmur of it, is not constant in these secondary cases, but may so completely disappear for hours or days, that when I first studied cases of secondary mitral incompetence following aortic disease, I several times accused myself of error in diagnosis. On my following visit, however, I should perhaps find that the murmur was reëstablished, and that the inconstancy lay in the facts themselves, rather than in the inferences. Dr. Peacock, in his *Croonian Lectures* (Churchill, 1865), also accepts, I think, Dr. Bristowe's arguments, and adds some interesting cases

* *Edinburgh Monthly Journal*, 1856. Quoted by Dr. Peacock, *Valv. Dis. of Heart*, p. 59.

† It is a matter of common experience that in valvular diseases especially fatty degeneration begins in the inner layers.

of his own to the same effect. Especially he refers to the great frequency of dilatation of the chambers of the heart in certain Cornish miners, who not only have heavy hammer-work during the day, but whose foolish masters exhaust them farther by allowing them no power but their own to raise them from the pit-bottom when their day is done. An hour of ladder-climbing is often required of them in an evening.*

In such a way is incompetence of the tricuspid and mitral valves brought about. Less frequently is it due to sudden violence.

A case of rupture of the mitral valve by sudden violence was related, I think, to the Pathological Society some months ago; and a similar case has been under my own care. The case made so strong an impression upon me, that I can call to mind all the important details; but unluckily the careful notes taken at the time have been mislaid, either by myself or by my clinical clerks.

It is perhaps a year since — came into the Leeds Infirmary under the writer's care. He is a wiry, well-made, rather small man, and his health and endurance were excellent until his accident some days previously. He is a riveter by trade, and accustomed to use a hammer. On the occasion alluded to he was working this hammer upon some heavy riveting with much energy and in a very constrained position. He was inside a boiler, and hammering plates or rivets situated above his head, so that the effort was considerable. While pressing on with his work, he suddenly 'felt something give way' within his chest; and he felt also a shock, not exactly of acute pain, but of an almost intolerable oppression. The distress was far too intense to allow of his continuing work, or, indeed, of his walking home. He went home in a cab, and has since been in great suffering from oppression and dyspnoea. He has now a lemon sallowness of face and an aspect of much distress from dyspnoea; his heart is excited, feeble, and irregular in action; the right ventricle is dilated; there is an intense systolic murmur round the apex of the left ventricle, and also behind; the viscera are congested.

Mitral lesions are not so dangerous to life as the aor-

* The impure air of the mines must, as Dr. Peacock says, also help in the matter. This bears out my observations of the like efficacy of small lungs or lungs supplied inadequately with fuel. Combustion must run short when heavy work is required in an atmosphere poor in oxygen and rich in carbonic acid. I ought to add, however, that my friend Mr. St. Aubyn, upon whose estates are copper and tin mines, tells me that he knows nothing of these heart-diseases in the miners; that they certainly die young, but in his experience they die of miners' phthisis.

tic; and the present patient, after eight weeks of rest and medicine, gained considerable relief. Cases of this kind, however, are very uncommon; this is the only one I have met with. One instance of tricuspid regurgitation, traceable apparently to labour, has occurred in my practice.

The patient was a marble-worker, and was accustomed both to lift weights and to grind down surfaces by means of a heavy slab, which he would incessantly thrust and drag alternately for hours together. His health had always been good until latter years, when his breath failed him gradually. Latterly he had been obliged to give up work. He was a temperate healthy-looking man, with strong venous reflux in the neck. On auscultation we heard only a murmur of tricuspid regurgitation; that is, a systolic murmur, loud all over the right ventricle, scarcely audible at the actual apex, and inaudible behind. The aortic valves were normal. He quickly sank with general dropsy and other evidence of venous congestion; but he declined to remain in the hospital, as I am afraid we showed too evidently our interest in his case.

It is, however, in the aortic region that over-exertion nearly always tells, primary injury to other valves being rare. As by natural selection it is generally the strong men who betake themselves to heavy work, so also it generally happens that the labouring heart grows *pari passu* with the dilating stress upon it, or nearly so. Again: puddlers, strikers, and other men who bring powerful frames into the market, are usually well paid, and their abundant diet and large lungs secure both sufficiency of fuel and sufficiency of combustion. But the severer their work and the more powerful their muscles, the more resistance is there to the flow of blood on the systemic side, and the more tendency is there, not to accumulation of blood in the right ventricle, but in the left heart and aorta. Now the left ventricle can meet this by muscular growth; and I have found in a few autopsies of such men killed by accident or acute diseases, that the ventricles, the left especially, are, like their bicipites, big and red. Such hearts are quite healthy when seen in an early stage, although the hearts may weigh, as in one instance, as much as sixteen ounces, and may often weigh eleven and twelve ounces. {miraculous
S.O.

The case is very different, however, with the aorta: it has no power of strengthening itself according to cir-

cumstances. Its resistance is great; but its activity is nothing, or rather it is nothing more than the recoil of elastic fibre. Strain of such coats as these, so far from bringing gain of strength, brings loss of elasticity and weakness; and in the hearts to which I have last referred, healthy as they are, and sound as the vessels may seem yet to be, the aorta is even now beginning to lose elasticity, and to dilate. The inner coats of such aortas, when carefully examined by the microscope, showed in two instances many points of endoarteritis, and a good deal of diffuse granular 'exudation' among the fibres of the middle coat. From this point, pouching of the aorta, with consequent or concomitant incompetence of the valves, is quickly established; and such cases form the staple of heart-diseases in the younger male patients of our hospital. The accumulation of blood in the aorta distends the vessel, and the heart, hypertrophied by this weight above it, beats with a violent pulse below; so that the two causes together stretch the vessel, bulging it in a manner familiar to all pathologists, and producing the miliary lesions in its tissues which are the starting-points of endoarteritis. During the earlier stages, the aortic valves remain competent, the patient presenting himself at this period with a heaving heart, the apex of which is displaced downwards and outwards, and with a rough systolic murmur over the sternum. The valves will still be heard to close, and the sphygmograph will delineate hypertrophy, aortic roughening, without obstruction and with valvular competence. Let this patient come again under notice, however, after a while, and suppose that he has pursued his work, in spite of some paroxysmal dyspnoea, and in spite of a peculiar anæmic state combined with nervous irritability and depression, which often are the only symptoms at this stage,—and we shall find that there is now incompetence of the aortic valves; either because the orifice has been stretched with the pouching of the vessel, or because the valves have given way as a flooring. Now we shall find two rough murmurs over the sternum, the second probably a rasping murmur; there will be more

decided dulness upon the manubrium sterni, and the aorta may be felt to beat behind the episternal notch.

The following is now the sphygmographic tracing—a hypertrophic upstroke, with instant arterial collapse, and without a vestige of dirotism; or if the valves be so placed and so stiffened by disease as to cross the orifice, we may have, and often do have, a moment of obstruction to the arterial collapse, as shown in tracing. For while the valves



Aortic Regurgitation with slight obstruction.

were competent, they, like the aorta, had long undergone a pressure greater than they could bear, and had suffered like miliary lesions resisted by like chronic inflammation; so that they had long been opaque, thickened, and perhaps rigidified, before they became incompetent; or as in one case on my list, they had become so brittle, that at a moment of greater effort they were ruptured, and regurgitation was established with a pang rather than by degrees. Though a man in this condition has about as bad a form of heart-disease as exists yet by rest, digitalis, and steel, much may be done for him; as is remarkably well seen in a patient of mine, suffering under such mischief, who is now being treated at the dispensary by Dr. Fothergill.* For, hard as it is to carry on the circulation, and suffering as these men therefore do from cerebral and general anæmia, with consequent dizziness and nervous depression, and from paroxysmal dyspnoea, yet they retain some compensation in the shape of hypertrophy of the left ventricle; and so long as they retain it, they may retain their lives; when it fails, the circulation must fail also.

Before we proceed to this last stage, let me relate two

* B. B., æt. 45, a collier who has undergone heavy labour. He is suffering from double aortic disease.

or three cases only out of a large number which I have before me. The cases are illustrative of the stage of aortic dilatation, and of aortic dilatation with valvular incompetence. The notes are much condensed from the records of my house-surgeon, Mr. Drake, and are supplemented by some remarks of my own, entered in a private book in which I preserve sphygmographic tracings. The first case is one of aortic dilatation with valvular competence.

J. M. is a porter; his habits are regular, and his family history good. Never had any rheumatism, or any illness; but of late had found his work too heavy for him. Had previously been accustomed to very heavy work. One month ago was compelled to give up work altogether, even the lightest, as he was rather suddenly taken with cough and paroxysmal dyspnoea. Such attacks have constantly recurred up to the present time, and may last as long as half an hour. There is no albumen in the urine. The dyspnoea during the remainder of his life was very severe: in the attacks the neck and face would become quite livid, but he found much relief from subcutaneous morphia, and from nitrite of amyl. The heart was dilated, and there was a blowing murmur with the systole heard over the upper sternum. There was also some dulness over the manubrium sterni, and soft deep pulsation in the episternal notch. The right radial artery was much weaker than the left. The urine was normal. Aortic dilatation was diagnosed. He died about a fortnight after admission in an attack of spasmodic dyspnoea. Tracheotomy was performed without relief. In addition to the aortic disease, the heart was found to be pale and heavy (weight not recorded). I have not any tracings of the pulse in this case in my possession; but the following is taken from an out-patient now under my care, who presents the same symptoms in a less severe degree. There is no regurgitation, but a rough murmur in systole over the aorta, and a more powerful heart. The tracing is from the right wrist.



I have just returned from the post-mortem examination of another case almost precisely similar to the foregoing. The symptoms during life had been similar, and so were the lesions found—a pouched aorta, and a large heart undergoing degeneration. There was mitral incompetence off and on some weeks before death, and the orifice was decidedly large, but not larger than the big ventricle would have demanded. The secret of the mitral regurgitation was found, as Dr. Bristowe says, in the muscoli papillares, which presented numerous patches of fatty

destruction, and which were rent on very slight stretching. The aortic valves were thickened and opaque, but not incompetent; the aorta above them was greatly dilated and diseased. The heart had evidently been larger than at the close of life, as was testified by the size of the orifices, of the valves, and of the papillary muscles, and also by the great extent of friction-patch upon its anterior surface. At death, and indeed before he came under our care, the hypertrophy had receded almost entirely as regards genuine power, and the wall of the left ventricle showed signs of advancing degeneration under the microscope. The mouths of the coronary arteries were widely open, and the vessels themselves were healthy and pervious.

Another good case of the same kind is that of G. R., the notes of which were carefully taken for me by Mr. Drake, my house-surgeon. He was admitted on April 14th, 1870, and is a moulder in a foundry. Family history good. His work has been among large castings, and very heavy, and he has been constantly engaged in heavy lifting. He worked chiefly in hot air, and was thus exposed to severe chills. Three months ago shortness of breath, palpitation, and loss of appetite came on. On admission, face anxious, *alæ nasi* dilated. Heart's dulness and impulse widely extended to right and left; apex-beat three inches below nipple and to the left of it; murmurs systolic and diastolic heard over the sternum; but there is a sound like the closure of the aortic valves over the third right costal cartilage; which I (the author) attribute in all these cases of regurgitation to the collapse of the dilated aorta, and I liken it to the same collapsing sound we hear in the systole of aneurisms, and which often resembles closely the normal aortic-valve sound. There was dulness over the aorta, and episternal pulsation; there was no murmur at the apex at all during his life; urine normal. He suffered much from anginiform dyspnoea, which was greatly relieved by nitrite of amyl, and better still by small injections of morphia. While in the hospital he had two slight attacks of embolism in the left Sylvian artery, each lasting about twenty-four hours, and affecting speech and motion during that time.

At the autopsy, the heart was enormously enlarged, and covered anteriorly with friction-patches; the left ventricle was thick and capacious, and the mitral orifice, valves, cords, and muscles all enlarged in proportion, but competent; the aortic valves were thickened, puckered, and incompetent; the aorta above them was largely pouched and diseased; kidneys showed only the usual beefy appearance.

In the next case of Robert F., a striker, accustomed to wield a hammer weighing fourteen pounds for a quarter of an hour at once, we found the same state of things. He distinctly attributed his ailment to the hammer, as after these rounds he has long suffered from dyspnoea and palpitation. He was, like the former patient, very liable to alternations of heat and cold. Mr. Drake tells me that he has found this a prominent condition in many of these patients, and he thinks that the internal congestion thus produced is an important factor in the causation of these heart-diseases. In the present case tricuspid regurgitation coexisted with aortic murmurs, systolic and diastolic. R. F. found, as most of these patients find, great relief from amyl and subcutaneous

morphia. The aortic systolic murmurs are always, we find, an evidence of a roughened aortic surface, and not of narrowing. It is the murmur of a pebbly brook, not the rush of an obstructed stream.

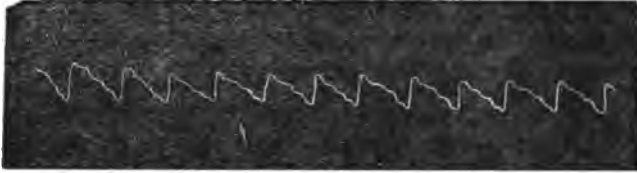
I could add a very large number of cases to these, but I should serve no good purpose by occupying more space. I have so far illustrated dilatation of the heart's chambers, distension, and consequent lesion of the aorta, lesion of the aortic valves, and compensatory hypertrophy. In the next place, I would refer to one mode of death seen in these patients, which is (8thly) by loss of the compensatory hypertrophy. This is only one mode of death. Many of these patients die, as the last patient died, with a big powerful heart yet remaining; and in them death is due, no doubt, to the primary disease, and to the numerous secondary affections which follow it. In other cases, however, death seems to occur from a loss of hypertrophic compensation; and this cause of death has, in my experience, seemed to be more common. I have before me now the heart and great vessels preserved from three cases in which death had thus occurred. All three patients were young and naturally vigorous men, who had been engaged during life in heavy labour. In all was found a diseased and dilated aorta, rough, opaque, and incompetent valves, and the remains of a hypertrophied ventricle. These ventricles are capacious, but flabby, and not very thick in the walls; they always present extensive friction-patches on the anterior surface; and the orifices are large. The mitral orifice may still be protected by proportionately enlarged valves, and the papillary attachments are long, though in this stage they are usually wasted. Like the ventricles, they were formerly stronger as well as larger. Under the microscope we may see the muscular fibre of the ventricle fatty; but I often find only indistinct striation, which in places may be so entirely absent that the tissue presents the appearance of common white fibre. I am not sure that this fibrous degeneration has been described. I have shown it repeatedly to the students in our post-mortem room, and have pointed out how, by following the same fibres, a gradual obliteration of the striation may

be seen, until all muscular character is lost. Such fibres cannot have a normal contracting value. Now, how is it that compensation fails in this way? In two of the three specimens before me the cause is obvious. In the first, the mouths of the coronary arteries are so blocked with atheromatous deposit, that a hair will barely pass into them. This condition I found in several such hearts in succession, and was prepared to formulate it as the one cause of loss of compensation; when to my disappointment I came upon a succession as long, in which these arteries were not only pervious and healthy, but as much wider than the normal as the heart was bigger. So, although blocking of these arteries is a cause, no doubt, of ventricular wasting, yet it is not by any means the only cause. In my second specimen, both coronary arteries are plugged by embolic matter, and are impervious: this patient fell off very quickly with symptoms of increasing distress and rapid deterioration of heart-power, the heart having been fairly compensatory until about a month before his death. This is probably a rare cause of loss of compensation. In the third specimen, the coronary openings are very wide, and the arteries are large and pervious. How came the ventricles, then, to waste? No doubt by loss of aortic systole.*

* Since the above was written, a fact has come to my hearing which, if a fact, is not only of the greatest importance to the present matter, but has a very wide bearing upon some of the most difficult problems in biology. In talking over the work of the heart a few days ago with Prof. Busk, he compared the loss of compensation above described to that which happens in the case of file-cutters. The file-cutter constantly exercises the arm in rapid flexions, and his biceps enlarges greatly. After a few years, however, this muscle again wastes and falls far below the normal value. This is so certain a consequence that the file-cutters receive high wages calculated upon the average duration of a hypertrophied biceps. Mr. Paget also tells me that he believes this to be the case, but I cannot hear of any published account of the matter. At present Mr. Jackson of Sheffield is kindly inquiring into the circumstances for me. If true, we are brought face to face with a strange discovery, which will have a direct bearing upon the limits of variation in the individual, and a direct bearing also upon some of the most serious practical problems of modern life. What is true of muscle is true no doubt in its degree of brains. But we certainly cannot go back to a belief in a preëxistent type or *παράθεγμα* for each organ; we shall have rather to study the matter in connection with the correlations of growth. Prof. Busk suggested to me that the case was but a parallel to 'writer's cramp'; but surely the fact to be noted concerning writer's cramp is the contrary—that while excessive writing is very common, writer's cramp is very rare.

The coronary arteries differ from all others in this, that they are filled during the diastole of the heart. To feed them well, we should have the systole of an elastic aorta, and competent valves below it. If either of these conditions fail, we may suppose that the coronary arteries are imperfectly fed. Part of the blood which should be shot into them is shot back into the left ventricle; and again, if the elasticity of the aorta be lost, the blood receives little or no impulse either way, and tends therefore to roll all back again into the ventricle by the mere force of gravitation. Even when the valves are competent, as in the case of J. M., a widely dilated and inelastic aorta ill serves its function as a coronary heart, and the ventricles which should be nourished by them fade away. The life which was possible to a heart whose additional strength could make up for the disadvantages under which it worked, is no longer possible when the strength of that heart is gone. With wasting of the ventricles, we have wasting likewise of the papillary muscles; and according to the degree of their wasting we have the constant or inconstant mitral regurgitation which precedes dissolution. Several of these hearts, and especially the three now lying before me, were watched by me during the greater part of their course: in one case, that in which the mouths of the coronary were made up, I had watched the heart for five years, almost without a break. The man, a most respectable heavily-labouring forgerman, came to me year by year at the dispensary and at the infirmary for the steel and digitalis which helped him on. At last he came into the house to die. When I first saw him he had dyspnoea, hypertrophy of the left ventricle, and a soft systolic murmur; then came more evidence of a dilated aorta, and then a diastolic aortic murmur; finally, he lost compensation, the sphygmographic upstroke fell from its inordinate height to less than the normal measure, the impulse of the heart became feebler and more diffused, and the water-hammering of the arteries subsided. Inconstant mitral regurgitation was heard shortly before death, and he was taken into hospital,

where he died in a few days. During these few days no arterial shock was perceptible, and the sphygmographic



Aortic Regurgitation with loss of compensation.

tracing showed that the steady regular pulse of aortic disease was broken up by the irregularities and intermissions of mitral regurgitation. The kidneys, in all these cases to which I refer, were of course substantially healthy; though no doubt in most of them the organs were congested and beefy.

I have made no allusion to the effects of beer-drinking in these cases. No doubt forgers and other labourers do drink large quantities of beer; but I cannot satisfy myself that any such changes as I have described occur in the innumerable young beer-drinkers of lighter occupations who frequent the hospital. It is in accordance with experience and with physiology to suppose that great quantities of beer are burnt off harmlessly during heavy labour. Teetotal labourers eat largely of hydrocarbons. For the same reason I omit any consideration of the effects of tobacco, which I have carefully eliminated in my consideration of the 'irritable' hearts; and of syphilis, which does produce aortic disease; cases of which I shall publish separately hereafter.

The other kind of aortic mischief which results from heavy labour, and perhaps as commonly as the kind already described, is primary aortic regurgitation; not consecutive, that is, to pouching of the aorta. If the aorta be uninjured, a slight incompetence of its valves may long remain unnoticed. When the regurgitation, however, becomes excessive, and the ventricle has to grow greatly, its violent impulse becomes annoying; it begins also to set up miliary lesion in the aorta, which was constructed for a ventricle of two-thirds the power; the

aorta then pouches, and we fall into the series of events already described. Why, in some cases, the valves go first, and the aorta subsequently; and why, in other cases, the valves take the lead in mischief,—is hard to say. I once strongly believed, and now have some belief, that continuous labour, such as hammer-work, was more injurious to the aorta; and that more sudden strains, like the lifting of weights, told rather upon the valves. Lately, however, I have met with cases which disturb this hypothesis; cases, that is, of valve-mischief caused by continuous over-exertion, and of aorta-mischief caused by sudden efforts. If, however, one sudden effort be the cause of mischief, we never find pouching of the aorta as a consequence; but we find a crack, which crack may be in the floor of the aorta causing regurgitation, or in the side of it giving rise to saccular aneurism. Thus it is with single efforts; but when we come to refine upon labour, and endeavour to separate it into two categories of sudden and continuous efforts, we find very often that the distinction is almost impossible. To show how long a rupture of the aortic valves may remain without results, I may relate the case of a gentleman who came to me for life insurance.

He was an admirable specimen in appearance, and I had nearly passed him, when the advance of the stethoscope from the apex of the heart to the sternum, to my astonishment, revealed aortic regurgitation. On cross-questioning, he admitted occasional unaccountable dizziness, but thought it was due to indigestion. He then told me, that seven years ago he went out to dig for gold, and laboured heavily in a kind of work, to which he was previously quite unaccustomed. One day he felt a 'sharpish' pain in his chest while exerting himself strongly, and he was never afterwards able to do so much. This accident indeed determined him to return home, when the rest and a more sedentary employment 'quite restored him to health.' On a more minute examination I suspected that the left ventricle was decidedly hypertrophied, though his large lungs concealed its state. I suppose there exists in this gentleman a degree of inadequate closure scarcely amounting to the rupture of a valve, and that the strengthened ventricle is equal to the additional work.

Take, again, the following case in a more advanced stage:

A gentleman came to consult me concerning some suspicions about his heart. He was well enough in appearance, and worked long hours in his profession, which did not involve much bodily exertion; but he

had thought for many years—perhaps for six or seven years—that his breathing was not unimpeachable, though he could run upstairs, and that his heart ‘pumped’ rather, though he could not say that he had palpitation. So little had this troubled him, that he had been intending to see me for a twelvemonth, but had not felt compelled to do so. I found his left ventricle very decidedly hypertrophied, and there was a diastolic murmur over the sternum. There did not seem to be any dilatation of the aorta. I was surprised to find this state of things in a professional man, and accidentally said to him, ‘This is the kind of heart I might have expected to find in a dock-labourer.’ He replied at once, that I had touched upon the very point of his own suspicions. Fourteen years before he had been placed with an uncle, a merchant, in whose warehouse he was constantly engaged in lifting heavy weights. This he did easily at first, but after a time he found that his power failed him. On lifting goods as before, he would suffer from pains in the precordial region and from palpitation, which so increased, that he was obliged to leave the business altogether. On resuming his more sedentary habits he had been much better, until after seven years, when, according to my interpretation, the accumulating effects of the overstrain seven years before began to make themselves felt.

Here, again, I believe that we had not to do so much with a sudden rupture of the aortic valves, but with a degree of incompetency resulting from prolonged pressure above them. Of all kinds of effort, lifting weights seems to be the most fruitful in establishing such lesion. The instances of this kind of lesion are so numerous, that it is difficult to make any selection from them, all agreeing as they do in these special features. When the aortic valves are actually ruptured by one special effort, there is usually very sharp pain and distress at the time, unless the rupture be very small, when pain and distress is also felt, but in no very alarming degree. In many cases the driving down of the valve is, as I have said, but the final event in a long series of changes in the texture of the valves, due to their incessant overstrain—changes which are visible to the pathological eye, as thickening, opacity, roughness, and maladaptation. In the following case rupture seemed to have been a final event of this kind:

Emmanuel Jones, a stonemason, under the care of Dr. Gray of Selby, was seen by Mr. Hutchinson, who happened to be in Selby. Mr. H. and Dr. G. were so good as to forward the man to the author. His age is 32, and he is naturally well-made and healthy; but for many years he has had unusually hard labour, especially in lifting weights. For certain reasons, which he detailed to me without any leading questions, it appears

that far more of this kind of effort has fallen to his share than is usual among his fellow-artisans. Five months ago he began to suffer from the characteristic pains in the precordial region. Three months ago he began to have difficulty in muscular work, and he is now very short of breath, and liable to cough heavily after exertion. When quiet he is pretty well. Three months ago, moreover, when all these general symptoms came forward, he began at the same time to hear a 'murmuring of the heart,' which made him uneasy. On investigation we found a loud aortic regurgitant murmur, and a systolic murmur also, due, however, to roughening, not to narrowing, of the orifice. There was no pouching of the aorta; indeed the compensatory hypertrophy, which sets up this injury by way of discrediting final causation, had not yet established itself. I lost sight of E. J. soon afterwards; but I have no doubt that careful strengthening of the heart by digitalis and the abandonment of manual labour might restore him to a more satisfactory condition.

One day, when talking to Dr. Todd of Selby, he mentioned a case of sudden rupture of an aortic valve which had occurred in his practice.

The patient, a bargee, while heaving at a capstan-bar, was suddenly stricken with intense pain and distress in the chest. He was removed to bed on board the boat, where Dr. Todd saw him. The regurgitant murmur was very loud and rasping. The man had previously been in good health; but nothing was known of his subsequent history, as he went down the stream with the boat and was no more seen.

Among many numerous references at my elbow, let me select again the following, which has also the advantage of being noticed by an independent observer. It was recorded by my friend Dr. Hyde Salter in the *Lancet* for September 24th, 1870.*

G. C., æt. 32, a fine young man, given to athletic sports, was seized with violent dyspnoea and palpitation while swimming in the beginning of October. The same thing recurred while rowing; and he became an out-patient on October 14th, when there was great orthopnoea. Well-marked aortic regurgitation was discovered.

No good purpose could be served by a mere repetition of similar cases — of cases in which prolonged strain had injured, or in which sudden strain had ruptured, the aortic valves. But I must beg for a little more space, in conclusion, to apply the like reasoning to my experience of aneurism; for I am satisfied that mechanical causes play a great part in the causation of aortic as well as of

* Dr. Fothergill has told me of another such case which occurred in a Westmoreland wrestler.

other aneurysms. I should have thought it unnecessary to say, that, in claiming attention for the mechanical origin of aneurysms of the aorta, I do not thereby deny a like effect to constitutional degenerations, were it not that such construction was put upon my remarks at the Association meeting at Bradford. So far from denying the constitutional origin of aneurysms, I had two cases of the kind at that time under my care. They were both thoracic aneurysms: the one was in an old man with general arterial disease; the other was in a young man rotten with syphilis. Both cases were at the time constantly pointed out by me as examples of the constitutional origin of aneurysm. But what I did say was this,—that we do not pay sufficient attention to the fact, that aortic aneurysms, both thoracic and abdominal, do so frequently occur in men who are young and of healthy tissues. If these patients attribute their disease to a particular strain, the note-taker is as likely as not to set the story aside as immaterial. I contend, that so far from being immaterial, a sudden strain is here not only a cause, but the commonest cause, of aortic aneurysm; for in the majority of instances this cause is alleged, it is reasonable, and it stands alone. The inner coat of the aorta is brittle by nature, and on a sudden distension of the walls of the vessel, it may be a trial of strength between this lining membrane and the same membrane on the valves which shall go first. That on the post-mortem the aorta is found to be ‘atheromatous,’ is no ground whatever for the complacent assumption that the ‘atheroma’ is antecedent. On the contrary, the endo-arteritis is as probably a consequence of the same kind as the diffuse mischief surrounding an injury to any other tissue. And as a matter of fact, we find this mischief in abundance immediately about the seat of the lesion; and it dies away gradually until it ceases, no such mischief probably being visible on any other part of the arterial tree. At the same time, as I often discover big hearts, and thick, opaque, but competent aortic valves in heavy labourers who have died of accident or acute disease, and who were not known to suffer from heart-disease; so, under the same circum-

stances, among our Leeds forgers, bargees, and the like, I find patches on the inner face of the aorta: sometimes many and large patches; patches, moreover, with unpleasantly-pitted and thin spots in them, which need but little encouragement to give way. One case of this kind in particular I call to mind, where the patient, a powerful bargee, died of pneumonia in the midst of apparent health. Here, I admit, I do more: I claim local degeneration as an antecedent of saccular aneurysm, as I have shown it to be an antecedent of pouched aneurysm. But that even this mechanical degeneration is not a necessary antecedent, I presume from the occurrence of aneurysm from accident in persons not previously devoted to heavy muscular work. I had lately, in conjunction with Mr. Teale, to certify to the cause of aneurysm in a policeman named Barrett—whether his disease was constitutional, or due to the exercise of his calling.

Barrett was a well-made man under 40, whose health was excellent, until one day, on endeavouring to arrest a carter, the man backed his horse in such a way as to jam Barrett between the cart-tail and a stone wall. He was seized at once with intense pain and breathlessness, and soon after undoubted symptoms of aneurism of the ascending aorta were developed. We went very carefully into the whole matter, and certified without hesitation that the aneurism was caused by the conflict in question. Dr. Moxon published a very similar case in the *Medical Times* for the 23d of July 1870.

In another case sent over to me by my friend Dr. Crichton Browne, of the West Riding Asylum, aneurism of the descending aorta was caused by a machinery accident. The patient, a well-made and previously healthy man, was whirled off his feet by a gearing-strap, and before the engine could be stopped he had been caught by the chest between the strap and a wheel, and seriously crushed. He suffered intensely from pain and dyspnoea; and soon after, symptoms of an aneurism to the left of the sternum were developed.

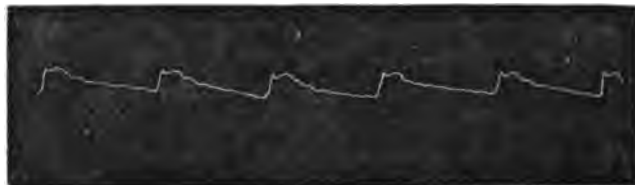
Or, again, I may quote the case of Higgins, now under my care, who when carrying a heavy load up some steps 'strained himself so suddenly that he nearly fell to the ground.' He was just reaching the top, however, and arrived there speechless, breathless, and in intense pain. He also spat some blood, and continued to do so for the next thirty-six hours, in lessening quantities.

I have not entered into any detail concerning physical signs in this essay; but I cannot help referring to the interesting fact, that in Higgins the only early sign of

aneurism was the existence of a first and second sound, like heart-sounds in length and tone, but not referable to the heart, and heard most strongly about two inches above the right mamma; thence towards the sternum they diminished in intensity; and the aneurysmal collapse-sound was gradually but certainly replaced by the aortic second sound, which was a little different in quality. On hard percussion some dulness could also be elicited at the spot above mentioned. Higgins was often shown to the clinical class at this stage; and afterwards also, when step by step the imitation first sound became rough and like a systolic aortic murmur, the dulness became more decided, and evident to slighter degrees of percussion. A thrill then appeared, and now pulsation to the right of the sternum is visible. The sphygmographic tracings of the right and left radial artery here given were taken soon after the full establishment of these signs.



Right arm.



Left arm.

If I turn to abdominal aneurisms, I meet with the same causes. These patients are usually young and strong men, and give a distinct account of the accident from which they date their sufferings. I need not multiply cases, as my paper is already getting very long; but I may allude to a young man who was sent to me at the infirmary from a distance, and who dated his abdominal aneurysm from an accident exactly similar to that of Higgins. He was

carrying a heavy sack up some steps, and 'twisted himself under the weight,' the twist being accompanied with severe abdominal pain. Thus it was too with Bentley, a case of abdominal aneurysm well known to all Leeds students of the years 1867, '8, and '9, as he was much relieved by large doses of iodide of potassium. He suffered likewise from violent tetanic convulsions, brought on by the pressure of the tumour upon the great afferent nerves of the back, the spinal column not being eroded. His life was wonderfully prolonged under great sufferings. He was a platelayer, and his aneurysm was caused by the slip of a piece of iron from his shoulder. In the endeavour to retain it, 'he felt something give way' below and to the left of the sternum. From that day he was unable to bear any exertion, whether of body or mind.

In all these cases a sudden and violent compression of the systemic arteries distends the aorta, at a time, perhaps, of cardiac systole,—the brittle inner coat gives way, the blood distends gradually the elastic coats, the vasal nerves are palsied, a sac forms, more nerves are palsied, and vasa vasorum are occluded; so that widespread mischief is thus added to the original injury.

It seems a truism to say again, how rare these affections are in women; and how clearly surgical aneurysms are, in most cases, to be traced to mechanical causes. One case I remember in particular which occurred in the infirmary. In it aneurysm of the femoral artery was set up by the incessant impulse of a hammer, the handle of which was brought into contact with the thigh at each elevation. It would be interesting to inquire whether at some foreign coaling stations, where women do the work, the liability to aneurysm in the two sexes be not reversed.

My limits urge me to complete this essay in as few words as possible; but I must refer briefly to one more consequence of mechanical strain, namely, to hæmoptysis. We not infrequently have this symptom mentioned to us as one of the events occurring at the time of the strain, when the initial lesion of an aneurism was supposed to have taken place. Yet if it were possible to suppose that the vessel had burst ever so slightly, the blood which

escaped would not be expectorated, but would diffuse itself between the tissues. There is no doubt that the hæmoptysis has nothing to do with the injury to the aneurysmal vessel, but is another and an independent consequence of the same strain. Over-exertion in running, in lifting weights, or the like, may no doubt so fall upon the pulmonary circulation as to cause hæmoptysis, as in like manner it may cause epistaxis. This fact was brought prominently before me by two cases of phthisis ex hæmorrhagia, which had occurred in my practice before the publication of Niemeyer's observations. I had been driven to suppose, in two cases, that pulmonary phthisis had resulted from hæmorrhage into the lung-tissue. Both the patients were unexceptionable men in personal and family history; and their health had been good, until the time when the lifting of too great a weight was in both cases followed by tightness of the chest, relief of the tightness by hæmoptysis, and by subsequent lung-destruction. One man was well known as a porter in the Leeds market. They both died of somewhat rapid pulmonary consumption. In several other cases I had been strongly tempted to attribute phthisis to hæmorrhage into the lung, but felt, and still feel, that such a supposition is very difficult, so long as there can be the slightest evidence in favour of its origin from other causes. It is remarkable, however, how many of those suffering from pulmonary phthisis among our out-patients seem to have enjoyed excellent health, until, from some cause or other, hæmoptysis appears; and from that day they enter into 'a decline.' It may be that in some instances accidental hæmorrhage concurs as a cause with a certain degree of constitutional predisposition; as accidental hæmorrhage no doubt may hasten the consumption of lungs already diseased.

T. CLIFFORD ALLBUTT, M.D.

III. ON SCARLET FEVER.

SCARLET fever is a disease which excites more than ordinary alarm in the minds of families, and sometimes occasions unusual difficulty as to treatment. It is uncertain in its mode of attack; capricious, and often deceptive, in its course. At one time or in one case it will seize its victim with a giant's arm, and crush him to death even before the nature of the enemy can be detected; at other times it will prolong the battle with uncertain success, sometimes being the conqueror, and at other times the conquered. Again, in other instances its attack is mild and apparently harmless for a while, until its victim is seemingly beyond the reach of danger, when another blow is struck which leads to an untimely death. With what do we require to be armed to come off victorious? There are three agents afforded us far more powerful than any we can supply, with which we ought in all these cases to occupy the ground; namely, good air, good water, and good diet. Prepared with these we shall at once disarm our enemy of his more severe weapons of attack, and reduce his power, in many instances, to what may be successfully dealt with by suitable medical appliances. The first, good air, dilutes and rarefies the poison; the second washes away impurities, and prepares the surface for the excretion of morbid matter; and the third fortifies the constitution, so as to render it less obnoxious to the depressing effects of disease. I know of no disease which has such a wide range between mildness and severity as scarlet fever. The first time I met with it as an epidemic in practice was in a country district about thirty years ago; the cases were very numerous, all attended with sore-throat and a well-defined eruption, but scarcely any were fatal; requiring no other

treatment than rest, ablution, fluid diet, and a mixture containing *infus. ros. c.* with a little acid and sulphate of magnesia, and perhaps an occasional mercurial aperient. It was sufficiently prevalent to be a harvest for the doctor, without being severe enough to create alarm or apprehension in his mind. Far otherwise was it, in an equally general epidemic, in the year 1844, the same district furnishing the examples.

About that period I received a summons from a wealthy farmer, holding an influential position in a distant parish, to visit a family, some of whose children had died so suddenly as to excite alarm and suspicion as to the cause of their death. He expressed some feeling of dissatisfaction towards the 'parish doctor,' who seemed to him not to understand what was going on; but who, as usual, had in no wise neglected his duty. On my arrival I witnessed a very distressing scene. On entering the solitary bedroom of the cottage, I saw two children lying dead, two more dying, and another seriously ill. Twenty-four hours before, all these children were in apparent health; and the cause of their dying thus suddenly seemed very mysterious. On carefully examining the eldest child, who, although seriously ill, had not been attacked so violently as the rest, I found both the sore-throat and the eruption of scarlet fever: she went regularly through the disease, and, after a severe struggle, recovered. All the others died in the stage of collapse, before any symptom diagnostic of the disease made its appearance; in fact, they were killed at once by the extreme virulence of the poison. A very severe epidemic of scarlet fever followed this; the disease spread with great rapidity for several miles along the course of a navigable river, and in spite of the greatest efforts to subdue it, proved fatal in many instances. The chief characteristics of this visitation were, that it attacked principally the lower orders; not confining itself, however, to such as were sickly or of weakly constitution, but seizing also the strongest of the strong—sturdy healthy labourers and their equally healthy children. The attack was generally severe from the very first, with but little premonitory illness; the throat was

rapidly and seriously affected with ulceration, the parotid and submaxillary glands enlarging, and often deeply suppurating; and connected with this, a copious acrid discharge took place from the nostrils, irritating and inflaming every surface with which it came in contact. The eruption varied much in character, but always appeared early; in the milder cases it was well out and florid, in the severe ones it was dusky and imperfect. Frequently the brain became dangerously implicated, and now and then a fatal issue was determined by a spreading of the inflammation to the glottis and larynx. In almost every case there was marked debility throughout, the pulse being feeble and uncertain, and the nervous system depressed. So alarming was the disease, that a gentleman whom I had recently engaged as an assistant—energetic, talented, and fond of his work—declared his inability to pursue his profession, if he were again to be subjected to attendance upon such an awful and unmanageable form of disease. There were several peculiarities in the eruption: generally speaking it was of a dusky hue, especially in weakly constitutions; although occasionally, in the strong and in adults, of its usual scarlet colour. In some cases it appeared in patches, like measles; and in a few it assumed the character of innumerable small vesicles, containing a clear fluid, and drying with a scab. In several instances the disease was accompanied with articular inflammations, precisely similar in appearance to those of acute rheumatism. The disease raged with great violence for several weeks, and then ceased, to return no more during my residence in the country.

In the year 1850, after removing to Norwich, I witnessed another epidemic of scarlet fever, accompanied with the same virulence and fatality as that I have described. The following is an instance of a form of the disease at that time of daily or hourly occurrence:

A child, *æt.* 3½, had been ill ten days with sore-throat and eruption, and getting worse, I was requested to consult with the family surgeon. The appearances then were: considerable ichorous discharge from the nostrils, materially interfering with respiration; glands on each side of the neck swelled and hardened; throat very sore, but not easily to be examined; eruption very dusky; pulse rapid and small; tongue brown

and dry; sensorium oppressed; but as opiates had been given, it was difficult to say how much of this belonged essentially to the disease. Deglutition seemed almost impossible; and the case put on a most unfavourable appearance. We directed all the hair to be cut off, and applied a solution of nitrate of silver (gr. iv. ad 3j.) freely to the nostrils and throat, and limited our internal remedies to giving a little wine occasionally.

On the following day (April 19th) we found the nostrils and fauces much improved, the latter scarcely reddened, and the former discharging much less. The eyes were less suffused, and the child was more sensible, but very irritable. Pulse still very rapid. As there was now rather more power of swallowing, we gave more wine, and a mixture with ammonia, camphor, and syrup of poppy.

20th. Rather more fever, eruption less dusky, and throat in a better state. Cont. remed.

23d. Less swelling on either side of the neck, but indications of commencing suppuration. Breathes freely through the nostrils; swallows well. Pulse 120. Frequent movement of the arms and picking at the nose. Bowels open; urine high-coloured. Ordered wine to be taken more freely. Countenance improved and of a less brick-red colour; but the mother thinks her sinking, because she takes little nourishment and is inclined to turn cold.

29th. Glands on both sides suppurating; but the child is in all other respects much better. Takes wine and animal broth.

Without entering into farther detail, the suppurating glands were allowed to break of themselves; and when I called to see the child a month after, I found her quite recovered from the fever, looking fat and jolly, the abscesses healed, and no vestige of the disease remaining but a slightly-depraved condition of the mucous secretion of the nostrils, which in course of time became quite healthy.

Less fortunate were the two following cases, which, however, well exemplify the severity of the disease: they both occurred in one family.

The first, a child *æt.* 3, had been ill three days, under the care of a very experienced practitioner, before I was summoned. The child was then comatose, with whistling breathing and indistinct pulse; eruption full and dusky; submaxillary glands enlarged and hard; great general prostration. The head was ordered to be shaved, and throat to be painted outside with *tr. iodin. c.* Wine had previously been given, and we recommended some ammonia in addition; but death took place in a few hours. This was on the 24th of July 1850; and on the 2d of August I was called in to see another child, a previously healthy girl, *æt.* 9, who had been attacked with scarlet fever only the day before. The eruption had been well out in the morning, and no threatening symptoms occurred until noon, when head-affection was suddenly ushered in by a terrible convulsion, and the patient never after became conscious. I saw her in the evening and at night, but considered the case quite hopeless; and she died at two o'clock in the morning.

A remarkable appendage to the foregoing melancholy history is the fact that, on the 14th of August of the same year, I was requested to visit *another* child belonging to the same parents, a boy of about ten years of age. He was also attacked with scarlet fever; and from their previous distressing losses, and great anxiety about their remaining child, the parents requested my attendance with their surgeon at once. The eruption was well out, and brighter red than in the other cases, and there were no symptoms indicating danger. He had an alterative powder, and a mixture with ammonia, nitric æther, and mist. camph., with such mild nourishment as he was able to take. The case progressed favourably, and he soon recovered.

How can we account for the different degree of severity manifested by the disease in these cases? There seemed to be no reason to attribute it to any worse state of general health in the two former than in the latter; indeed all three children seemed previously to have been perfectly well. Might it not be that the energetic endeavours made to purify and cleanse the house after the two deaths disarmed the miasm of some of its influence by lessening its concentration, diluting it with pure air, and perhaps neutralising its poisonous qualities by the disinfectants freely used about the rooms? If so, it is one of the most striking instances, among hundreds of others, of the value of cleanliness and pure air, not only in the preservation of health, but in the removal or annihilation of those poisonous influences which, when in a concentrated form, have in all ages occasionally decimated the world.

I will relate another case, showing the malignant type assumed by this disease in the year 1850, my attendance on which cost me a severe illness of several weeks' duration with sore-throat and low fever, evidently the result of contagion, although I had had scarlet fever as a child.

November 2d, 1850, M. W., æt. 22, had been attacked with scarlet fever three days before I was summoned in consultation. The eruption was unwilling to appear; tongue half covered with white fur, but dry, and red at the tip; pulse 150. He was slightly delirious; and there was an ulcer at the back of the pharynx inclined to slough. Mr. — had applied a blister to each side of the throat, which I advised to be removed as soon as they should redden the skin, for fear of troublesome inflammation and sloughing in such a low condition of the system. The treatment consisted of a powder containing calomel, p. antim. and Dover's powder at bedtime, quinine and tincture of bark every four hours, and the ulcer to be painted with a solution of nitrate of silver.

3d. Slough separated from the ulcer in the throat; and he can

swallow better; but he was delirious in the night, and the pulse is scarcely perceptible. Countenance purplish and puffy; manner and speech very incoherent, and scarcely any eruption. Altogether in a very unpromising condition.

1 P.M. Taken since the morning nearly a pint of beef-tea; and I now gave him a draught of port-wine and water, which his attendants could not get him to take before. Pulse 150, and feeble.

9 P.M. Pulse 120, and much more distinct. Eruption has come out plentifully. Has taken his medicine every two hours, with a spoonful of port-wine added to it; he has also taken a little porter. Delirium less severe and constant; throat not now complained of, but red; has passed urine freely, but bowels not open. Head to be kept cool. *Cap. cal. gr. iij. stat., and haust. papav. nocte si opus sit.*

4th. 10 A.M. Passed a much quieter night, and is still under the influence of the opiate draughts, two of which had been taken in the night. Pulse 120, and distinct; eruption not so red as last night; tongue very red, and inclined to dryness; urine plentiful; bowels not open. Could tell what was o'clock by my watch. Takes broth freely. *Cont. med., and adhib. enema statim.*

10 P.M. Bowels acted twice; tongue moist. General state much the same. *Reprtr. haust. anod. nocte.*

5th. 10 A.M. Pulse 130, and rather more feeble. Has passed urine in the bed. Tongue moist, and countenance good; but he is less able to take nourishment. *Cont. med.*

10 P.M. Pulse 130, but not weaker. Has passed urine again in the bed. Brain confused, with some wandering and subsultus. Refuses his mixture, the acid in which appears to hurt his mouth. Takes freely of beef-tea and port-wine. Blistered surface on one side of the throat irritable. Desquamation commencing on the face; eruption still fully out in the feet and legs. *R Dec. cinch. ad Oss.; tr. cinch. c. ʒss.; syr. aurant. ʒss. M. capt. cochl. ij. ampl. 3tiis horis. Cal. gr. j. c. sacch. h. s.*

November 6th. At 7 o'clock this morning I received a message to say the patient was dead. Indeed, all yesterday his life seemed to be hanging on a thread, and there was scarcely a chance that he would materially improve.

I watched this case with the greatest anxiety, because, though it set in with so much severity, there were several occasions during the treatment on which our hopes were raised, and we thought recovery possible. The remedies several times *told* upon the patient, and seemed as if they might possibly gain the mastery; but he was placed in very unfavourable circumstances; in a small room almost filled up with his bed, and in a house literally crammed from top to bottom with old furniture; so that it was really a matter of no slight difficulty to get to his room in the upper part of the house.

In the form of scarlet fever we have been considering there is but little opportunity of observing premonitory symptoms; but if there be one more than another by means of which we might prognosticate an attack of scarlet fever rather than any other eruptive disease, I think it would be lumbar pain, which is sometimes very severe in cases where the distinctive eruption is preceded for a day or two by general febrile disturbance. My attention was first directed to this circumstance by Dr. Seymour, at St. George's Hospital, in relation to a case then under his care, which not only exemplified the fact I have stated, but also the extent to which the blood may be contaminated, and a mode of treatment which would not in the present day be thought of in such a pathological condition, viz. venesection.

The *treatment* of this disease is, after all, the most interesting branch of the inquiry; and the practical conclusions at which I have arrived, after many years of experience, are the following. Keeping in view the low type of diseases in general at this period, I believe that in mild cases, where no local complication of urgency appears, little more is required than free ablutions, free ventilation, a mild alterative aperient, and a little simple fever-mixture, with sp. æth. nit. to keep the kidneys in action.

For the relief of those severe cases in which there is a profuse ichorous discharge from the throat and nostrils, with disposition to sloughing ulcers in the pharynx, I have seen no local remedy so successful as the free application of a solution of nitrate of silver (from four to eight grains to an ounce) by means of a brush or syringe. I have never seen it do any harm—which I cannot say of the solid nitrate; and often, as in one of the cases recorded, it has appeared to be the single means by which life was preserved; for until it was used, neither respiration nor deglutition could be sufficiently well performed to give any other remedies a chance. The application of the solid nitrate I have known to produce extensive and dangerous cedema of the pharynx and palate, and sometimes to cause an extension of sloughing, as if there was not sufficient

vitality in the parts to resist the immediate caustic action of the remedy. The part is destroyed without the power of reaction, and, instead of benefit, greater danger is the result.

With regard to the large and deep abscesses which so frequently occur in the salivary glands, and present externally, I believe the best plan is simply to foment or poultice them, and let them break of themselves. This I have tested in several instances: in the same individual, when abscesses have formed on both sides of the neck; and especially in one instance, in which a very large abscess formed below either clavicle in a young girl, after a very dangerous attack of scarlet fever. I have opened them on one side, and left them to discharge themselves on the other, with the invariable result of a quicker recovery, a smaller scar, and less constitutional disturbance, under the latter plan; so that I have now made it a rule of practice never to have them opened artificially, unless they are so situated that important parts are in jeopardy. Once or twice I have seen these abscesses so deep under the ear, that the sloughing of the soft parts has laid bare the carotid artery, which nevertheless itself resisted the sloughing process, and remained intact.

With respect to the constitutional treatment of scarlet fever in its severer forms, there are perhaps few better medicines than small doses of dilute hydrochloric acid in camphor mixture or decoction of bark. Opiates are objectionable on account of masking the head symptoms, but are sometimes required to overcome pain or restlessness; and as a means of avoiding or lessening the objection, I have found a much smaller dose of opium conjoined with a little *v. ant. tart.* produce the desired effect, than if opium were given alone. Port-wine, brandy, and animal broths will in most cases be found indispensable; and when the stomach is irritable and refuses these, I have seen the best effect from frequent small quantities of milk and lime-water, the latter in the proportion of one-third.

If counter-irritation be required on account of any internal inflammation or congestion, I prefer turpentine, applied to the skin on flannel, to blisters, which I have

more than once seen productive of great distress and danger, on account of the low state of vitality of the surface with which they have been in contact.

One of the most common of the sequelæ of scarlet fever is dropsy, with albuminous urine; an untoward complication, and one which generally supervenes at a time when all idea of danger has been removed, or most probably in cases where no danger has been apprehended. It occurs more frequently after mild cases; and early exposure to cold during convalescence appears to be the most frequent cause. Many years ago I published a short paper on Scarlatina in the *Medical Gazette*, vol. xxx. p. 96, chiefly with reference to the treatment of the dropsy which often supervenes. I there remarked, that 'this affection (dropsical effusion) is generally considered to be of an inflammatory character; and blood-letting and other antiphlogistic remedies are recommended for its removal. The general success of such measures is also established by the concurrent testimony of various authors; but during the late epidemic I had occasion to treat the disease in patients who had been so much debilitated by the previous attack of fever, that I had not the courage to further reduce the powers of the constitution.' I was then induced to make trial of iodine, which I prescribed in the form of Lugol's solution. 'Of this solution I ordered from five to ten drops for children, and from ten to twenty or twenty-five to adults, three times a day in water. In the first case in which it was used it rapidly effected a cure; in consequence of which I prescribed it in every succeeding case that presented itself, and with the same complete success. If iodine have not hitherto been employed for the cure of anasarca swellings after scarlet fever, I believe I shall have the happiness to have introduced to the profession a safe and effectual remedy for a troublesome and obstinate affection. If others have employed it, I have the gratification to add my testimony to the good effects of a mode of practice not so well known or recommended as it seems to me to deserve.'

I have transcribed the above remarks because they are still applicable as regards my further experience of the

x *quantity of iodine solution, containing about 5 grains of iodine in 100 grains of water, = 1 in 20. I used 10 drops of the one, & 10 gr. 0.100 of the other.*

treatment of scarlatinal dropsy. I have always used the same remedy (now in the form of the liq. potas. iodid. comp. of the London Pharmacopœia), and may now, as I did then, confidently affirm that it has invariably been attended with success. Sometimes it has for a while appeared to fail; but on increasing the dose the desired effect has been produced, and the patient has recovered. Many such cases have presented themselves at the Lind Infirmary for the diseases of children. All that have come under my care have been thus treated, and in no instance without a favourable result. In private practice also many similar cases have been cured by it, where the disease had resisted other treatment, and led to my being called in consultation. The following is an instance of one of the most severe forms of the disease, in which this remedy was rapidly and entirely successful:

A child, æt. six years, had been attacked with a very mild form of scarlet fever three weeks before. There had been but little eruption, and the child appeared to be rapidly recovering; but after exposure to the air, having been allowed to go out, she was seized with anasarca, which gradually extended so as to become general. There was also effusion into the cavities. The urine was scanty and albuminous; and the child was suffering so much from dyspnoea, that the slightest alteration from the upright position almost produced suffocation. The pulse was very rapid and indistinct; and it seemed that a fatal issue was imminent, the more so because the case had been treated with the greatest care and attention, and the only remedy I had confidence in under such circumstances had been already tried. On inquiring, however, as to the dose, I found that a much smaller one than I had often prescribed had been ordered, and I strongly urged another trial of the liq. potas. iod. c. in drachm doses every four hours. There seemed but little chance; but happily on the following day the breathing was less laboured, and the child was actually able to lie down with the head but slightly raised. Suffice it to say that a continuance of the treatment produced the entire removal of the dropsy; and when I called again in about a week, the little girl was playing about almost well. She had no return of the disease.

I relate the following case as an example of the low type often assumed by scarlet fever, and of the way in which, in a previously unhealthy or delicate person, it sometimes depresses and destroys vital power:

W. M., æt. 19, had been attacked with scarlet fever a *week* before I was consulted, on the 9th of November 1851, on account of the disease

having exhibited a tendency to assume a very low typhoid character. I found the throat not very sore, but the mucous membrane dry, and the teeth covered with sordes. Pulse 130, and unsteady. Glands of the right side of neck swelled; eruption well out; skin perspiring; slight muttering delirium; bowels relieved the day before. He could swallow without much difficulty, and took broth and wine. He had a warm poultice to the throat, and a saline mixture with gr. v. ammon. sesquic. every three hours. On the following day the eruption was dark and patchy, but in other respects he appeared better. There was less delirium, pulse a little firmer, tongue not quite so dry. He was ordered to continue the medicine, and to take an ounce of port-wine every two or three hours. He continued to improve a little daily with respect to the symptoms properly belonging to the fever, and we were hopeful of him, *except that the pulse remained at the same frequency and as feeble*, notwithstanding other signs of improvement; but on the night of the 16th he died, so quietly, that his mother, who was with him all the time, thought he was in a comfortable sleep, and did not know he was dead until I told her. Had his constitution been sound, I believe he might have recovered; but his pulse was always *trying* to increase in frequency, except when he took freely of the wine; and at last his weak heart ceased to beat, and he died of asthenia. He had suffered before from an attack of fever at Liverpool, from which he recovered with great difficulty; and his medical attendant prognosticated that he would not recover if subjected to another attack of severe disease.

In conclusion, I wish to make a few remarks upon a subject confessedly of the utmost importance, and which has been frequently discussed of late, namely, the means of preventing the spread of scarlet fever. It is without doubt a very great scourge in this country, and no very satisfactory conclusion appears to have been arrived at as to how it is to be prevented, or how its progress may be stayed. Opinions vary much upon the subject; but, after a long professional life, I hope I may be excused if I express, without any desire to dogmatise, the conclusions which my own experience has led me to adopt. Without discussing how scarlet fever first originates in any particular district, I dwell upon the mode of its propagation, and how it gradually increases in severity. A boy at school gets an attack of mild scarlet fever, and is sent home to a distance; his father's house is recently built and well situated, and the locality is healthy. This boy passes through a mild regular attack, and recovers. But soon a younger child is attacked, and then the nurse; and both rapidly die. Another child dies; and in a day or

VOL. V.
was $\frac{12}{126}$... $\frac{5}{126}$...
if unusually ... 3.25 gr. ...

two the mother also; then a fine boy of four years old is seized in the morning, and dies at night in the stage of collapse, without presenting any of the distinctive marks of scarlet fever. One child, the eldest, only remains, and he is sent to an old almost unoccupied farmhouse, goes through a mild attack of scarlet fever, and recovers. The other members of the household are sent away to the seaside, and an examination of the premises is made to ascertain, if possible, the cause of this dreadful mortality, all the deaths having occurred in the course of one week. I should say there was no scarlet fever in the neighbourhood at the time of this sad occurrence, nor did it spread to any other house in the village. I found nothing to complain of in the house—a new parsonage, clean and convenient in all its arrangements; but there were two water-closets; one upstairs for the ladies, and the other on the ground floor for general purposes. The waste-pipe of the former emptied itself into a covered drain running along the bottom of a fence to a great distance from the house; the latter discharged its contents into a square open bin situated close to the back door. Into this latter closet all the excreta of the patients and bedroom slops had been emptied; and to the exposure of them to the air in the open bin I attribute the increased virulence and fatality of the disease after its first importation into the house.

Very recently I was summoned to a neighbouring town to visit a young gentleman at school there; but being out of the way at the time, another practitioner from Norwich went in my stead. This was on a Sunday. On the previous Friday the boy had been playing cricket, and was not ill till that night. My friend found him moribund, and he died in a few hours. He seemed to have died of some acute attack in the head, and it was difficult to say what killed him in so short a time.

After a few days I was called in consultation to another pupil of the same school, but who had been sent to his own home, as his father resided in the same town. He was fourteen years of age, and previously in good health; and I found him labouring under a severe

attack of scarlet fever, with eruption fully out all over him of a bright scarlet colour; with hot skin, rapid pulse, ichorous discharge from the nostrils, and drowsiness. His throat was sore, but not very much affected; he could be roused pretty easily; and I discovered no very dangerous complication. He was treated simply with liq. ammon. acet. and sp. æth. nit., the usual fever-mixture, and enemata when required. The nostrils were treated with nitrate-of-silver solution applied on a brush. I saw him again next morning, and found him not at all worse, and the nostrils decidedly better. Before I left the house I particularly cautioned his father not to allow any of the excreta to be put down a water-closet, but to be at once removed and emptied into holes in the garden, at a distance from the house, and covered with mould. I heard afterwards that he made a good recovery. But three other cases occurred in boys from the same school, two of whom died, showing a mortality of three out of five cases. My patient's brother had afterwards a very slight attack; his father had a little sore-throat; but his mother, a delicate lady, who nursed him night and day throughout his illness, escaped the contagion altogether.

The result of my experience and my firm belief is, that scarlet fever, whatever may be the nature of its infectious principle, is propagated and intensified by the exposure of the excreta of those who are affected by it, and that they are the pabulum on which its miasm, whatever it may be, delights to feed. I am equally convinced that a speedy removal and disinfecting of these excreta will prove the best means of rendering the disease milder in its character, and less likely to spread its venomous influence in the localities in which it may chance to prevail.

E. COPEMAN, M.D.

IV. CASES OF ACCIDENTAL POISONING.

IN the volume of our *Reports* for 1868, I narrated, somewhat at length, a case of poisoning by stramonium, which contained two or three features of peculiar interest.

The three following cases are not of nearly so striking a character, and are given more as a slight contribution to the study of toxicology than as containing anything specially remarkable; though there are peculiarities in the first worthy of notice, from the combination, and perhaps antagonism, of the constituent ingredients swallowed.

I think too they will serve to show how almost impossible it would seem to be—notwithstanding all the care and precaution observed, and rightly observed, in the present day—to prevent some persons making mistakes between medicines for external and those for internal use, when such intense carelessness prevails in overlooking the very patent differences of shape, size, and colour of the different bottles.

CASE I. *Poisoning by Veratria.*

I was called one morning in great haste to see a lady who had been some time under my care, who, I was told, had, about two hours before, swallowed, by mistake, a large dose of liniment instead of a draught; and was suffering severely from its effects.

Knowing that I had prescribed veratria in a liniment for her, about a week before, for very severe tic douloureux, I immediately concluded what had happened; so I called at the chemist's on my way, and getting a sulphate-of-zinc emetic, some mucilage of tragacanth, and some tannic acid, I hastened to my patient.

I found her, as might be expected, in a great state of alarm, having not long discovered her mistake. She told me of her carelessness, not even looking at the directions on the bottle; the *size* being about the usual draught-phial. She was now complaining of great giddiness, feelings of sickness, thirst, relaxation of the bowels with tenesmus, and a peculiar sensation which she described as if the whole of the intestines were tied together by a strong cord continually tightened. She said she also felt dreadfully tired, weak, and faint, as if she had undergone some

tremendous exertion; though she had enjoyed an excellent night's rest, and had only just finished dressing, when she so incautiously took the veratria instead of a mild aperient draught which she was ordered before breakfast.

Her tongue was much swollen, the mouth and throat very sore, as if she had swallowed boiling water; the pupil was extremely contracted, the breathing hurried, the pulse quick and very small; and there was excessive feebleness in the action of the heart. There was a sense of constriction in the fauces, rendering swallowing difficult. There were continual calls for micturition, independently of the quantity passed during the action of the bowels, which had freely moved twice or thrice; and what was to her the most prominent, because the most teasing, symptom of all, was a continual tingling over the whole skin, and now and then sudden fits of the most unbearable itching in different parts of the body, compelling her to scratch and rub vigorously in the most uncontrollable manner. A notable symptom, usually present even when veratria is smelled, was strangely conspicuous by its entire absence: there was, and had been, no sneezing.

I immediately administered a sulphate-of-zinc emetic in some mucilage of tragacanth with a dash of brandy. This acted speedily with relief; the ejecta smelling strongly of chloric ether and laudanum. The pulse regained volume—for hitherto it had been like a mere hair under the finger; the pupil too became somewhat more dilated; the breathing not so hurried, the tongue less swollen, and she could swallow fluids much more easily.

After the emetic had acted a second time she expressed a sense of great relief from nearly all her symptoms, especially the intense languor and weariness. The pruritus, however, continued to tease her terribly, and indeed worried her all the day, passing off very slowly, and only really ceasing the third day after.

When the effects of the sulphate of zinc had quite subsided, I administered doses of tannic acid in brandy-and-water, with a view of forming an insoluble precipitate with any veratria not yet assimilated and taken into the system; and I certainly considered it was decidedly beneficial, as the whole amount of veratria taken proved very large.

Shortly after my arrival I looked at the liniment-bottle, and allowing fairly for the quantity which had been used for rubbing on the cheek for tic, I found she must have swallowed nearly, if not quite, three grains! Now, considering this large quantity, I could not but deem the present symptoms very mild.

Fortunately for her, it had been made up with glycerine, chloric ether, and linimentum opii; each of which, I think, may be fairly said to have contributed its quota towards the mitigation of the full effects which would have occurred had the veratria been taken alone.

I need not state the farther progress of the case at length; the symptoms all gradually gave way, and she made a speedy recovery, the pruritus being the most persistent and annoying enemy.

As to the subsequent effects of this large dose of veratria, I may state that the tic douloureux was most effectually cured; at any rate, it ceased for several months; a fact not to be lost sight of. Also, for at

least two months after the itching had subsided, there continued an exceedingly troublesome tingling all over the skin, as if she had been stung by nettles, though without any rash, or indeed any sort of appearance of irritation. But the most peculiar, and to me the most unaccountable, result of this misadventure was, that for some considerable time afterwards, when she was eating, or laughing heartily or talking animatedly, there would frequently be a spasmodic closure of the lower jaw, which would shut suddenly with a loud snap! It certainly was in some way attributable to the poison, as she had never had it before; and this, with the pruritus, gradually wore away, and eventually ceased entirely.

Some questions arise as to the effects of the combination of drugs in this case.

Was the absence of sneezing—a symptom so universally present if veratria comes into contact with the mucous membrane of the nostrils—in any way caused by the presence of the opium preventing the peculiar sensations in the mucous membrane of the air-passages, and subduing the action of the laryngeal nerves and arytenoid muscles? The soap and glycerine acted as so much sheath to the mucous membrane of the stomach.

Did the opium (3℥. of laudanum was contained in what she had swallowed) prevent more catharsis? For certainly there was but trifling diarrhoea, considering the large amount of irritant poison.

How much of the tight closure of the pupil was due to the veratria, and how much to the opium?

Did the tannic acid form an insoluble tannate of veratria, and so prevent more veratria being taken up into the system?

Would not the veratria have been more rapidly absorbed, had it not been for the anodyne influence of the opium on the stomach?

On the other hand, *mutatis mutandis*, did not the veratria have some antagonistic effect on the opium, as well as the opium on the veratria? For there was not the slightest soporific effect, though $1\frac{1}{2}$ gr. had been swallowed!

Lastly, Is it possible to imagine greater carelessness? The draught she was to have taken was a 1-oz. phial, clear glass, of a transparent pink colour, and of course duly labelled and wrapped in white paper. The liniment was

in a 2-oz. phial, blue glass, fluted, wrapped in blue paper, with 'Poison,' 'Not to be taken,' labels on it. Could the chemist have observed farther precaution? Moreover, it had been used twice or thrice as an external application. Yet the liniment was nevertheless swallowed instead of the draught! How, then, can physician or chemist prevent people being poisoned, if they wilfully make such egregious mistakes?

✕

CASE II. *Poisoning by Caustic Ammonia.*

I was called up about two o'clock one morning to see a lady who had been some time under my care, and who sent her coachman in breathless haste to tell me she had taken the liniment in mistake for the anodyne draught. I immediately remembered having prescribed the ordinary linimentum ammoniæ, and was prepared, so far, to know what to expect.

On arriving at her house, I found her, naturally enough, greatly agitated, and certainly suffering severely from the effects of her mistake. From the time of her having taken the ammonia to my seeing her fully two hours had elapsed, as she lived more than a mile from my residence. The coachman had to be roused, and to dress; I had to go through the same process; and, with all the alacrity that can be observed, time runs away on such occasions faster than one is apt to think.

The following, then, was the state in which I found her. She was breathing in a hurried short laboured manner; complained of severe pain in the throat, much aggravated by speaking, though her voice was only the faintest whisper; the pulse 136; skin very hot and dry; no perspiration. She had a hard hissing cough, which she endeavoured to stifle, as it caused her much pain in the chest, extending also to both mammae, which she described as tumefied and tender; and these, which were very largely developed, she held tightly when the cough came on. The tongue was terribly excoriated; so was the whole of the mouth; and the throat also as far down as could be seen. She had extreme dysphagia; not so much from absolute inability to swallow—though this was in itself considerable—as from the amount of pain it occasioned from the lips right down the whole œsophagus to the stomach. There was much tenderness, not only about the epigastrium, but over the entire abdomen, which she could not bear pressed in any part. There was a copious and continuous flow of tears, and a considerable discharge of mucus from the nostrils. The intellectual functions were not at all disturbed, neither was there any pain in the head; proving that it was the ganglionic, not the cerebral, system which was being acted upon by the irritant poison.

Here, then, was decided inflammation of the entire lining membrane of nostrils, mouth, and the whole air-passages, as well as of the stomach, and part, if not all, of the small intestines.

Fortunately there was no vomiting; but still I had difficulty in

This case is recorded in the Journal of the Medical Association of London, Vol. 1, p. 100.

getting her to swallow; and the vinegar which I gave, greatly diluted, caused considerable smarting, from the rawness of the whole mucous membrane. But she persevered, and succeeded in getting down a tolerable quantity, which she constantly described as creating a great commotion in her stomach, like an effervescence there.

Not long after the vinegar was taken copious perspiration occurred; and by and by she managed to swallow salad-oil and milk; and under such emollient remedies internally, and constant poppy fomentations and cataplasms externally, the intensity of the immediate symptoms was slowly subdued.

I found on examining the bottle that she had taken about seven drachms of the liniment, that is, something like two drachms of liq. ammoniæ fort. The admixture of the olive-oil had, of course, acted as a partial sheath to the corrosiveness of the caustic, which would have otherwise been still more irritating in its effects, bad enough as these were.

In a day or two there were some nasty ulcerations of the mouth and fauces; large portions of epithelium were constantly discharged; the bronchitic symptoms also increased; and the inflammation had extended to the kidneys; for hæmaturia existed for about twenty-four hours, but no fibrinous casts were detected by the microscope.

The treatment pursued throughout was soothing and supporting. After the primary and urgent symptoms had abated, I administered large doses of chlorate of potash with glycerine and infusion of buchu. The chlorate was also used as a gargle with tannin-glycerine. As soon as she was able, she took bismuth, made up with tragacanth mucilage almost as thick as paste, and combined with buchu and uva ursi alternately; for the mucous membrane of the whole intestinal canal, kidneys, and bladder continued exceedingly irritable for many weeks. Such is a rude outline of the treatment.

The progress of the case was in the main very satisfactory. The dyspnoea was rather persistent after the bronchitic symptoms had left; and the aphonia remained somewhat obstinately. Even after the voice returned, there was a peculiar ringing hoarseness for a long time; and indeed the sequelæ had not finally left her in less than three months.

Here, again, what carelessness! What an unnecessary risk had been run, which could have been so easily avoided! The embrocation had been ordered to be applied at bed-time; the anodyne draught to be taken if necessary. The liniment was applied; and then, instead of being put quite away on the mantelpiece or elsewhere, was positively placed on the little table by the bed-side, close alongside the anodyne draught!

Of what avail was it that the liniment-bottle was, as usual, blue, and duly labelled '*Poison: for external use only*'? The patient, drowsy, but not sleeping soundly, put out her hand, and, by the tiny ray of a night-light, was un-

able to detect colour or size. All the precautions so rightly taken to prevent mistakes were overlooked in the unwise and unnecessary contiguity of these two bottles; and the serious—it might have been fatal—error was made in an instant.

A chemical question arose in my mind when thinking over the effects of the vinegar in this case. The patient volunteered the remark twice or thrice, on taking the vinegar, that there was a sort of ebullition or effervescence in her stomach; and certainly, coincident with its administration, or at least not long afterwards, the skin, which had been hot and burning, became moist, and a free perspiration at length occurred.

Now, is ammonia absorbed free, and does it pass in a free state to the blood, when taken into the stomach; or does the gastric juice neutralise it before absorption? Dr. Bence Jones's experiments lead him to believe that it undergoes oxidation when given in large doses. Lehmann and Jaffé deny this conclusion. Dr. B. W. Richardson believes that it exists naturally in the blood, like soda. This is denied by Kühn and Gamgee. We do know that the neutral salts of the alkalies with vegetable acids undergo oxidation in the blood, and are changed into carbonates, thus rendering the urine alkaline.

If the ammonia is neutralised by the gastric juice, is it impossible that it may be farther converted into a carbonate—under certain circumstances—in the stomach? If this be so, the vinegar which was administered in this case transformed the carbonate farther into an acetate, with the usual effervescence.

This is a rough theory; but the facts of the commotion noticed by the patient, the eructations which followed, and the after results of free perspiration, remain. They may possibly be capable of a more perfect chemical explanation. Unfortunately I did not test either the urine or perspiration, to discover if alkalinity existed.

The foregoing case when it happened brought vividly to my mind a similar but still more alarming case, which occurred during my attendance on out-door patients at the New-Town Dispensary, Edinburgh, thirty years ago.

There is no evidence, nor is there any evidence of acid and free base. There is no evidence of acid or base. The case is a case of acid and base. The case is a case of acid and base. The case is a case of acid and base.

In this case there was no fault on the patient's part; but it is scarcely possible to imagine a more flagrant act of carelessness on the part of an attendant.

CASE III. *Poisoning by Caustic Ammonia.*

A poor girl under my care, in the Canongate, was given by her mother, in broad daylight, an ounce and a half of hartshorn-and-oil instead of the same quantity of castor-oil. Both these bottles were directed in the most clear and distinct manner: the former, 'To be used night and morning;' the latter, 'To be taken immediately.' Now the *appearance*, one would have thought, was quite sufficient to have caused the old body to have noticed her mistake, castor-oil being a remedy so well known to the poor. The pungency of the *smell* too should have added to the immediate detection. But yet this mother gave her child—about fourteen years of age—the hartshorn instead of the castor-oil! One would scarcely believe such a mistake to be possible. At this time linimentum ammoniæ was made up of one-third ammonia, and of two-thirds olive-oil; so that the patient had swallowed four drachms of liquor ammoniæ fort.!

At least nine or ten hours elapsed before I saw this unfortunate girl, whom I then found in a most pitiable state. My chief amazement was, how she could have swallowed such a quantity without having her breath taken away by its potency, as well as her deglutition impeded by its causticity. But she explained, that she had such an intense dislike to castor-oil, that she always made up her mind, whenever she had to take it, to hold her nose and let it down at a gulp; and though she felt it dreadfully hot, she succeeded in swallowing it all. The consequences were most terrible. Besides the indescribable state of excoriation of tongue, mouth, throat, &c., which were absolutely denuded of every scrap of epithelium, she had double pneumonia, and such a train of symptoms as compelled me to send her off instantly to the infirmary.

She lingered in great agony for many weeks; but by the aid of a strong constitution, and the incessant care, skill, and kind attention bestowed upon her, she did eventually pull through; but left the infirmary a perfect wreck, in a sadly emaciated state; and I think, up to that time, still suffered from entire aphonia. I never heard of her after history.

C. PAGET BLAKE, M.D.

would be likely to be found in the stomach. The
are in the stomach; the first is the most likely to be
active would be quite as likely to be as the
lucifer.

V. THE MODERN TREATMENT OF SYPHILIS, BASED ON THE EVIDENCE ADDUCED BEFORE THE COMMITTEE APPOINTED TO INQUIRE INTO THE PATHOLOGY AND TREATMENT OF THE VENEREAL DISEASE PUBLISHED IN 1867.

NOT only is the subject of the treatment of syphilis occupying the thoughts of the medical profession more and more daily, but their attention has within the last few years been seriously drawn to the question of the prevention of the disease. It has even extended beyond the bounds of the profession; and at length the legislature has taken the matter in hand. In fact, the world at large are beginning fully to realise the baneful effects that the disease inflicts on society in general, and to inquire for themselves whether some judicious steps might not be taken, if not to eradicate the disease, at all events to diminish it.

Acting on these impressions, the Lords Commissioners of the Admiralty, in the year 1864, appointed a Committee to inquire into the pathology and treatment of the venereal disease. This Committee consisted of eight distinguished members of the profession, with Mr. Skey as their president, the naval and military medical services being represented.

Their lordships proposed the following subjects for discussion:

1. Whether mercury is an agent to be indiscriminately resorted to in the treatment of syphilis.
2. The proportion and nature of the cases in which administration is useful or necessary.
3. The proportion and nature of the cases, if any, of primary and secondary disease in which it may be entirely dispensed with; characterising the form of the dis-

ease, if any, in the treatment of which mercurial agency is not required.

4. The best antidotes to injurious mercurial action on the human system.

5. Any practical rules which the Committee can suggest to the naval and military authorities to diminish the frequency of the cases of contagion, and which are capable of adoption in the daily life of the ship or barrack.

Sixty-four witnesses were examined before the Committee. All these were experienced in the different branches of the subject under inquiry; and out of this number fifty-six were members of the profession.

In 1867 the Report was published. Being much interested in the subject of the baneful effects of syphilis on our troops, I have carefully studied this Report, and have made a digest of the evidence given by the several witnesses. It demands close attention, as the high positions occupied in the profession by both the Committee and witnesses, not only in this but also in foreign countries, is a guarantee that the matter was investigated in a thoroughly scientific manner, and with a desire that the result of their labours should be a benefit to society at large.

The object in view in penning this paper is, to lay before the reader a concise statement of the conclusions which the evidence brings us to with regard to the pathology and treatment of syphilis; and I propose to consider these two points only, as the subject of the prevention of the disease is so vast, that it would be impossible to do justice to it in a paper like the present one. Having considered the evidence given on these points, it is then proposed to inquire, What has been the result of this Report?—has any decided doctrine with regard to the pathology been generally accepted since its publication three years ago?—and has it made any difference in our mode of treatment?

One fact will at once strike the reader of the Report, and that is, the diversity of opinions expressed by most of the leading members of our profession on both the pathology and treatment of syphilis. That so many scientific men should hold such opposite opinions will

suggest to the mind that there must be something radically wrong with regard to our knowledge of the disease; and it is feared that this paper will in a measure confirm that suggestion, although it appears to me that some of the differences require only a little careful investigation in order to dispel them. Mr. Samuel Lane, from his evidence, would lead us to infer, that a great deal of the present uncertainty about the disease has been caused by the writings of late years on the subject, which have made the matter appear more difficult than it really is.

The Committee were first occupied with the examination of two pamphlets written by the late Dr. Macdoughlin, who gave evidence. It was intended to show in these pamphlets—first, that no such disease as syphilis existed; secondly, that mercury was given in a reckless manner in the army by military medical men. I need hardly say that he failed to convince the Committee on the first point; and with regard to the second, his evidence failed to substantiate the assertions he had previously made. My own experience in the service is quite the reverse. I very much doubt if any class of practitioners treat syphilis in a more careful manner. Their opportunities of observation are very great; and I believe their plan of treatment is, as a rule, based on scientific principles.

I will now pass to the consideration of the pathology of syphilis, and endeavour to ascertain what the evidence on this subject would tend to teach us. Here we at once come to the great bone of contention. This all along has been the 'rock ahead' upon which so many theories have foundered; and I wish I could at once say that the evidence had enabled the Committee to settle definitely this great point. I regret to say that such is not the case; in fact, it has left us in a sea of ambiguity more troubled than ever. I must therefore examine into it more carefully, and ascertain what conclusions can be drawn from it.

I think this will best be accomplished by inquiring—

1. Are there two forms of venereal sores, depending upon different poisons, and whose effects on the constitution are essentially different?

2. Can one form of sore always be distinguished from the other?

On the first question forty witnesses gave evidence. Of this number, thirty-five were of opinion that there are two different forms of sores; and only five took a contrary view. And I believe that most surgeons in the present day will at least admit this much; as it must daily fall to the lot of most of us—who have a fair amount of experience in such cases—to see the two forms well and clearly defined: one represented as a soft sore, secreting pus plentifully; and the other characterised by an indurated base, and not as a rule discharging pus, but only the *débris* of lymph. But when the fact of the two sores depending upon separate poisons is investigated, we do not find such unanimity of opinion. Sixteen witnesses only coincided with this theory; twenty-two were decidedly against it; and two were doubtful about it. It is for us to inquire into the causes of this disagreement, and try if possible to clear up the existing doubt. In order to do this as effectually as possible, I propose to examine into the *pros* and *cons* that were put forward in evidence.

Those who stated decidedly that there were two different poisons, always producing different sores and sequelæ, were very few in number; but there were some, and among them was Dr. Byrne, surgeon to the Westmoreland Lock Hospital, Dublin, who stated that 'the soft sore is never followed by constitutional symptoms, unless there be some modification of it.' The majority of the witnesses who were in favour of the double-poison theory stated, in addition, that they had not infrequently seen the soft variety of sore followed by constitutional symptoms. I account for this discrepancy in the following manner. The soft sore which has been followed by secondary symptoms has been a soft sore with something added to it; and that something has been the true syphilitic poison; in fact, the local and constitutional disease have existed together. I believe that in the majority of these instances there has been a certain amount of induration accompanying these sores, though it may have been so slight as to escape anything but most minute inspection.

But I admit that in some instances the induration upon which so much stress is laid is altogether absent. I cannot help thinking that too much importance has been attached to this one symptom. That when present it is a very valuable one, I frankly admit; but its absence does not negative the fact of the sore being a true infecting one. Mr. Henry Lee, in his published lectures on *Practical Pathology*, vol. ii. p. 8, makes some very sensible remarks on this point. 'A physician,' he says, 'may be unable at once, or at all, to form a diagnosis of a particular kind of fever or disease from the presence or absence of one symptom; but he can, and does daily, form a correct diagnosis by the consideration of a group of symptoms, and the conformity or nonconformity of his patient's illness to it.' The infecting chancre is no exception to this rule. We must be guided by a series of symptoms; and I hope to be able to show that it is quite possible, by carrying out this rule, to diagnose each form of sore with certainty.

I am led to the conclusion, that it is the mixing of the two poisons in one sore which has led to so much disagreement, by personal observation of a large number of cases. And I cannot call to mind any case of soft chancre, which was purely such (and by this latter I mean unattended by any of the signs of an infecting sore), that was followed by constitutional symptoms.

Twenty-two witnesses, I have stated, were decidedly against the theory of the duality of the poison; and we must inquire into their reasons for believing thus. Here, again, we shall see that their great reason was, that they had so frequently seen the soft sore followed by constitutional symptoms. Our answer to this must be the same as before—viz. that they have been dealing with mixed poisons. But supposing, as is the case with many, that they will not admit of this solution of the question. How, then, do they account for such very different results from one poison? Some would lead us to believe that the soft sore is only a modification of the genuine syphilitic poison. By some means it has been diluted, and therefore its effects have become less potent. Others state that the matter with which the system has become inoculated

has been old, and thus become degenerated; and a third lay all the stress upon the constitution into which the virus has been received. 'As your soil, so will your fruit be,' say they. I cannot agree with any one of these theories, nor do I think that recent investigations tend to confirm them. That a diluted poison should produce such very different results, is hardly conceivable. Surely the constitution would be tainted to a greater or less extent, and would give some greater evidence that so noxious an element had been received into the system, even though diluted, than a small sore, which heals in a given time, and gives no farther trouble. With regard to the degeneration of the poison: if it has become so degenerate, it can no longer be looked upon as the same thing, and must be classed among other decaying and effete matters. Nor do I think that the third theory is more tenable. That the condition of the constitution shall determine whether such a virulent poison as syphilis is to produce only a local or general contamination, is, I think, unreasonable. We do not find this to be the case with other poisons. If the poison of variola is inoculated into a system which has not previously been infected with it, we see definite results, and it runs a known course, whatever the state of the constitution; and so with other diseases depending upon a specific poison. We do not see them at one time producing a local result, and at another a general one. Why, then, is syphilis to be a great exception to this rule? I do not believe that such is really the case. In other systems, 'as your soil, so will your fruit be,' does not hold good. If wheat be planted in a field, it will not depend upon the soil whether the fruit it yields will be wheat or oats; into whatever soil it is placed, the result is always the same; and such is the case with the human soil.

I fear that I have said enough to show that a great variety of opinion existed at the time the Report was drawn up as to the unity and duality of the poison; and before attempting to show what has been done since in order to settle these differences, we will examine into the evidence given on the second question—viz.

Can the infecting form of sore always be distinguished from the non-infecting?

Thirty-six witnesses gave direct evidence on this question; and it will be at once apparent, from what has gone before, that their decision was against the idea that the appearance of the sore *per se* was indicative of its true nature. But, on the other hand, positive evidence was given by twenty witnesses, stating that there was a concomitant symptom which at once decided the kind of sore that had to be dealt with. That symptom is the condition of the lymphatic glands in the neighbourhood of the situation of the sore. Induration may be absent, and a chancre may present all the appearances of a non-infecting sore; but the attendant enlargement of the lymphatic glands gives a totally different aspect to it. Mr. Longmore, the Professor of Military Surgery at the Royal Victoria Hospital, Netley, stated in his evidence that he generally considered the condition of the glands of the groin to be characteristic of the infecting and non-infecting sore. Mr. Comrie of the Royal Navy went so far as to say that one may be deceived by the induration of the sore, never by that of the glands; and Mr. Paget, following in the same strain, stated that hardness of the glands is as good a sign of syphilis as the induration of the sore itself. Mr. Prescott Hewett stated that he looked principally to the inguinal glands to denote that a patient has had constitutional syphilis. The remaining sixteen witnesses who gave evidence on this question either stated that there were no means of diagnosing accurately the two forms of sores, or that they had not observed any particular condition of the glands which attended one kind of sore more often than another. The majority were of opinion that it was somewhat rare to see constitutional infection accompanying the soft variety of sore, and therefore looked upon induration in many cases as a valuable indication; others looked upon all forms of sores on the genitals as syphilitic, and treated them as such.

We have now to consider what has been done since the Report was published in order to settle these much-vexed questions. Three years have elapsed since it was

put into the hands of the profession, and some good work has been done by the inquirers in this path of surgery.

Perhaps nobody among the numerous syphilographers of the present day has given a clearer description of the two forms of sores and the means of accurately diagnosing them, than Mr. Henry Lee, surgeon to St. George's Hospital; and I must take this opportunity of thanking him for the many valuable suggestions he has given us from time to time, both with regard to the pathology and treatment of syphilis. In his published lectures on *Practical Pathology* he treats of the two forms of sores as two distinct diseases, one being purely local, and the other constitutional. The former he terms the local suppurating contagious sore, which runs a definite course, and then terminates without any constitutional sequelæ. He states that, as far as he is aware, from personal observation, this venereal ulcer has never been known to infect a patient's constitution so as to produce secondary symptoms. This form of sore is frequently accompanied with lymphatic absorption, which produces a suppurating bubo. Its great characteristic is, that its secretion, when placed under the microscope, presents all the appearance of true pus—in fact, it is such; and this pus is auto-inoculable, and its course throughout is one of suppuration. When the lymphatics absorb this pus, only one lymphatic gland is infected, and that runs a suppurative course. Unfortunately this auto-inoculability does not entirely decide the question of the nature of the sore, as it does occasionally happen that the two forms of disease exist in the same sore. Mr. Henry Lee states in his lectures that he has collected as many as forty-nine cases of suppurating bubo. Of this number, five only are recorded as having been accompanied or followed by any secondary affection during the period that they remained under observation, and these five are satisfactorily accounted for. He adds, that, having directed his attention for a considerable period of time to this subject, he has not been able hitherto to find a single unequivocal case in which a soft suppurating sore had clearly given rise to a suppurating bubo, and at the same time to constitutional syphilis. Another point

of mystery Mr. Henry Lee has also cleared up; and that is, by accounting for the occasional appearance of secondary symptoms with a soft sore and suppurating bubo. He does this by pointing out the fact, that it will be found that the system has already been previously infected with syphilis, and that the constitutional symptoms are only the reappearance of an old disease. Having watched and recorded a considerable number of cases which have occurred during the past seven years in the regimental hospital of the 1st Life-guards, I fully indorse all Mr. Lee's statements on this matter. I have never satisfied myself that I have seen constitutional symptoms follow the pure suppurating chancre; and I therefore believe it to be a simple local disease, as different from syphilis as scarlatina from measles; and I think I shall be able to show that it can at once be diagnosed from the other and severer form of sore. With regard to the genuine infecting form of infecting chancre, it seems to be pretty generally admitted that it can, as a rule, be diagnosed with tolerable certainty. The difficulty all along has been to decide whether a sore which has many of the characteristics of the local contagious disease, and yet belongs to the infecting type, will be followed by constitutional mischief. I have already stated my belief that the simple soft sore in its true form is never followed by secondaries; but sometimes we have a mixed sore presenting itself, and then it becomes a nice point to decide what will be the results. By a mixed sore, I mean an infecting chancre which has been inoculated from a local contagious sore, or to which some irritating matter has been applied which has caused simple suppuration. I use the word 'simple' in order to distinguish it from the suppuration attendant on the local contagious disease, which I believe to be specific in its nature. In the form of sore now under consideration the character presented by the secretion under the microscope will only mislead; but there is a diagnostic sign which I believe to be pathognomic, and it is the one on which the twenty witnesses previously mentioned chiefly relied. I allude to the condition of the lymphatic glands, which Mr. Henry Lee has described as 'amygdaloid,' others as

the multiple indolent bubo. A whole chain of glands become indurated, and feel like almonds beneath the skin. Except in their very early stage of induration, they are not tender to the touch, and their condition is easily recognised. Mr. Henry Lee, speaking of this state of the glands as a diagnostic symptom, in his *Pathological Lectures* (p. 87) says: 'It has been said invariably to accompany the true syphilitic sore. This does not coincide with my experience.' My own observation on this point leads me to a different conclusion. I believe that it does invariably accompany the infecting chancre, and that it is a true and certain sign of its character, and that its absence would make me confident that I had not true syphilis to deal with. This induration, when once established, is present for an almost indefinite period of time, probably until the syphilitic poison is entirely eliminated from the system. So much, then, for these two much-vexed questions. Much-vexed, I believe, because the subject has not been thoroughly understood; but when it is so, doubt seems to be cleared away; and I trust I have shown that the two forms of disease are distinguishable from one another, and that with certainty.

The next point of inquiry must be directed to the question, Is secondary syphilis communicable? Twenty-six only out of the fifty-six medical witnesses examined were able to speak with anything like confidence on this point. Of this number, twenty-two were in favour of the theory, that secondary syphilis is communicable, and four took an opposite view. It will at once strike the reader of the evidence, that many of those who were in favour of the theory spoke with considerable reserve about it, and some stated that their conviction was rather the result of surmise than actual experience. At the same time, it must be noted that several of them were very decidedly in favour of it. Among them are Mr. Langston Parker, who stated that 'secondary syphilis is communicable as such;' and he goes on to say: 'I believe uterine discharge will produce indurated chancre in a man who has never had the disease before.' Mr. Gascoyen also stated, 'He had no doubt that the constitutional disease was communicable

from one sex to another. If the secretion from a mucous papule be deposited in an abrasion, that will contaminate the person.' On the other hand, among the four who held contrary opinions will be found names that must also carry great weight with them. Sir William Fergusson stated, 'that he did not think that there would be any danger in a woman with secondary syphilis remaining on the town;' and Mr. Acton goes so far as to say, in answer to the question, Do you believe that syphilis may be communicated by contact with persons affected with secondary symptoms? 'I am certain that it cannot.'

This is a very serious question, and one deserving considerable attention, as the answering of it affects materially the number of women who would be implicated by the Contagious Diseases Act.

That secondary syphilis under certain circumstances is communicable, I have not the least doubt. And I have arrived at this conclusion as the result of personal observation. I had an opportunity of watching the case which Mr. Henry Lee mentions in his *Pathological Lectures*, page 132. In this instance, there is no doubt that the disease was communicated to the woman by the child. The condition necessary to make secondary eruptions communicable is, Mr. Lee states, that of secretion; but when once this is established, there is no difficulty in inoculating with the poison a person who is previously free from syphilitic taint. Mr. Hunter's cases, published in the second volume of his works, page 475, clearly bears out the assertions I have made, although they were not recorded to elucidate this matter. There can be no doubt that the nurses whose histories are there mentioned derived their infection from infants tainted with constitutional syphilis; and the results of the transplantation of teeth taken from syphilitic persons tend still farther to corroborate the fact. But it would appear from experiments made in 1862, and cited in Mr. Lee's *Pathological Lectures*, that an eruption is not necessary to communicate the secondary disease, as the blood alone taken from a syphilitic patient is inoculable. He relates the facts of a most interesting experiment which was made to

prove this, in which an indurated chancre, accompanied with the characteristic glandular enlargement and secondary eruption, followed the inoculation of the blood of a syphilitic patient into a healthy subject. I therefore think that recent investigation clearly shows that constitutional syphilis is communicable, and therefore that women who are the subjects of it fairly come under the penalties of the Contagious Diseases Act.

Having to a certain extent disposed of the conclusions arrived at with regard to the pathology of syphilis, I propose, in the next place, to inquire into the evidence which was adduced with regard to the treatment. Here, again, we are met with scarcely less diversity of opinion than we have found to be the case with regard to the pathology. We have to contend with mercurialists and non-mercurialists, including under the latter title those who advocate syphilisation as a means of cure, and those who recommend that the disease should be allowed to run its natural course without interference. In order to ascertain what conclusions may be drawn from the evidence given on these several points, we will consider the following questions:

1. Should mercury be administered in all forms of primary sores?
2. Is mercury beneficial in any particular form of primary sore? If so, in what form should it be administered?
3. Is mercury beneficial in the secondary evidences of the disease, or is there another therapeutic agent which gives better results either alone or in combination with mercury?
4. Are the results of the non-mercurial form of treatment as successful as the mercurial?

On the first of these questions forty witnesses gave evidence. Of this number, ten were of opinion that mercury should be administered in all forms of primary venereal sores. Most of them recognised but one form of sore, and treated it accordingly. On the other hand, eighteen stated that it was not necessary to give mercury in all primary sores. These recognised the two distinct chancres; one (the soft) constituting the local, and the other the

infecting or constitutional disease. Four witnesses stated that they never gave mercury in any form of primary sore, and three were doubtful whether they should not give it in both kinds. Mr. J. R. Lane stated, 'that though he did not always treat the soft form of sore with mercury, still he believed that it would be always safer to do so.' Five witnesses never gave mercury in any form of the disease from beginning to end; three of the latter number treating all their cases by syphilisation.

From what has already been stated with regard to the pathology of the disease, it will be surmised that I hold to the opinion that mercury ought not to be used indiscriminately in all primary sores. In the true local disease it is not only unnecessary but hurtful, as it appears to us to retard the healing of the sore. We have not in these cases to deal with the poison of syphilis, and therefore should not treat it as such. We have seen that this disease runs a definite course, and terminates without infecting the constitution. Our treatment, therefore, should be based on this principle. If there be no contrary indication, I believe the best practice to be at once to destroy the sore with strong nitric acid; keep the patient in bed so as to prevent irritation of the parts, which would tend to increase the chances of a suppurating bubo; support the constitution with a generous diet and ferruginous tonics; and in the very great majority of cases the patient will get well in about a fortnight or three weeks.

We must now pass to the inquiry into the evidence given on the second question. On this point forty witnesses also gave evidence. Twenty-one were of opinion that it was especially in the indurated form of chancre that mercury was most beneficial. The impression made on the minds of those who had thus treated the disease was, that it healed the sore, postponed the secondary infection, and modified it when it made its appearance. Very few were of opinion that it gave exemption from secondaries, but some were of this opinion. Among these was Mr. Acton, who stated that 'he was sure that mercury gave exemption from syphilitic disease.' Dr. Marston, of the Royal Artillery, believed that mercury and

syphilis were antagonistic. Mr. J. R. Lane stated that he believed mercury tended in a hard sore to the absorption of the induration, and to diminish the liability to secondary constitutional affections; and he mentions a case where there had been well-marked induration for weeks, and mercury had been given, and no secondary affections had appeared for a very long time. Mr. Paget stated that 'he regarded mercury really as a specific for syphilis in this sense, that, provided the patient is one who can safely take mercury, it will very materially shorten the duration of the indurated sore; and if it can be favourably received into the system, will prevent the occurrence of secondary symptoms.' Nine witnesses did not recognise any particular form of sore in which mercury should be given, as they gave it in all. Five never gave mercury at all in primary sores; and four were non-mercurialists. One recognised only an ash-coloured form of sore in which mercury was useful; this was Dr. Stewart, Surgeon-Major in the Bombay Army, who stated that in India secondary affections most frequently accompanied this form of sore.

From the above statements it would appear that the majority of the witnesses recognised a sore in which mercury proved useful as a therapeutic agent, because, in addition to the eighteen who were decidedly of this opinion, the nine who did not recognise any particular sore in which it should or should not be given, nevertheless were decidedly of opinion that it was beneficial in indurated chancres.

My own experience in a regimental hospital, where the opportunities of watching cases for almost any length of time are very great, has taught me that in the infecting form of sore there is but one safe practice, and that is, the continued administration of mercury in some one form or another. I indorse again Mr. Henry Lee's statement in his lectures on *Practical Pathology*, vol. ii. lecture xxxiv., where he states, 'that it may be safely affirmed that the general experience has proved that no remedy exists possessing so great a power over the syphilitic poison as mercury.' My strong impression, after watching a large number of cases, is, that in some instances (though I

am far from saying in the majority) mercury does prevent the occurrence of secondary symptoms. At the same time, I believe I can state with perfect confidence that it does postpone the appearance of the secondary affection, and mitigates it where it does do so.

Having decided that there is a syphilitic sore in which mercury is decidedly beneficial, we must next inquire into the evidence given with regard to the form in which it should be administered. Twenty-six witnesses stated their opinions with regard to this. Eleven gave the preference to blue-pill, six to inunction, three to fumigation, two to mercury and chalk, two to Plummer's pill, one to the bichloride of mercury, and one to the protoiodide. The remainder of the witnesses either did not give any opinion on this question, or considered it immaterial in what form it was given. Of all the preparations of mercury that I have mentioned, I find that blue-pill has the greatest number of supporters; and my own observation leads me to give my vote in favour of blue-pill in the primary infecting chancre. I believe that in this form its effects are most easily managed. As a rule, it is well borne by the system, and it is a clean and convenient mode of administration. At one time I greatly preferred administering mercury by fumigation according to Mr. Henry Lee's method, and which he so strongly advocates, and with which he has had such good results. Of late I have discarded it in the primary sore, as it appeared to me that the results were not so satisfactory as they are when mercury is given in the form of blue-pill. I believe that the ill results spoken of as the result of this drug are in a great measure due to want of care in its administration. While taking it the patient ought, if possible, to be kept in bed, or at least in a perfectly equable temperature. The weight of the patient should be registered before commencing the treatment, and this should be repeated every third or fourth day. I am indebted to Mr. Cutler for this latter suggestion, and it has proved to be a most valuable one in the treatment of syphilis. As soon as the mineral begins to have any pernicious effect on the system, it will be immediately indicated by loss of

weight, even before other well-known symptoms present themselves. The mercury should at once be remitted for a short time, a purge be given; and the patient will almost invariably regain the lost weight. So valuable an adjunct in the treatment of syphilis do we consider this, that in our regimental hospital a patient who is admitted with a primary infecting chancre is weighed at once, and the weight is registered every third day.

There is a third condition that I would strongly insist on, and that is, the combination of some tonic with the blue-pill; and I have found the sulphate of quinine to be most beneficial. My usual mode of administration is, three grains of blue-pill with two of the sulphate of quinine. If these precautions be carefully adopted, I feel convinced that the treatment by blue-pill will prove both safe and effectual.

We next pass to the consideration of the evidence given on the question, Is mercury beneficial in the secondary evidences of the disease, or is there another therapeutic agent which gives better results either alone or in combination with mercury? The evidence given was decidedly in favour of good results being obtained by the judicious administration of mercury in the secondary sequelæ. Thirty-five witnesses gave their opinion on this point. Thirteen were of opinion that mercury alone should be administered; nineteen were in favour of a combination of mercury and iodide of potassium; and three only considered that iodide of potassium alone was sufficient to cure the disease. Of the thirteen witnesses who were in favour of mercury being administered alone, many considered that it was only in the tertiary stages of the disease that the iodide of potassium was of value as a remedial agent. The preparations chiefly advocated by these witnesses were the bichloride of mercury and fumigation. Those who recommended the use of iodide of potassium alone had but few followers, as experience had shown that, though a valuable adjunct to mercury, yet when given by itself it was disappointing in its results.

Mr. Henry Lee, in his Pathological Lectures, strongly advocates the calomel vapour-bath in secondary syphilis;

and here I cordially agree with him. I believe, from my own observation, that in the eruptive form of syphilis there is no remedy like calomel fumigation. It cures quicker than any other mode of treatment, and the patient's system does not seem to be impaired by its use. With regard to the iodide of potassium, I believe that it does assist the action of mercury in this stage of the disease; but it is in the tertiary stages that it becomes such a valuable curative agent in eliminating the poison. When given alone, it certainly does seem to get rid of the symptoms for a time; but they return in a short period, and are as troublesome and severe as ever.

It would appear, then, that mercury is the medicine to be administered in the secondary disease, and that there is no medicine which alone gives such good results; but that the iodide of potassium, in combination with it, assists its action very much.

From the inquiry into the mercurial we will pass on to the non-mercurial plan of treatment. I propose to include under this head the conclusions which the evidence brings us to: 1. As to the results of leaving the disease entirely alone. 2. The results of the abortive treatment. 3. The results of the treatment of syphilis by syphilisation so called. Twenty-one witnesses only gave evidence on the first point. Eleven of these were of opinion that if the disease were left alone, it would eventually die out; but they did not advocate this plan. Mr. Paget stated, 'that though he did not think that mercury might be advantageously abstained from as a system, still he did think that if cases of syphilis are left to themselves, the patients, in course of time, spontaneously recover.' Three witnesses were decidedly in favour of the 'do-nothing' system; and among the number will be found the name of Dr. Heron Watson, surgeon to the Royal Infirmary, Edinburgh. He stated that it was his practice either to leave the cases (except locally) entirely to a spontaneous issue, or to use syphilisation. He adds, that he had watched more than half-a-dozen cases under the former method, and that they had done well. I have lately been in communication with Dr. Watson on this

subject, and have to thank him for his kindness in acquainting me with the result of his experience since he gave evidence before the Committee; and I cannot do better than quote his own words:

'My experience' (he says) 'of a more recent period leads me to the conclusion, that syphilis left absolutely *untreated* by any specific system cures itself; and that recrudescences or relapses are so very much not the rule, that I have recently abstained from all treatment, except what one would employ in a *chloranæmia* with special tendency to nervous complications.'

Seven witnesses were strongly against the plan of doing nothing, and as strongly advocated some special treatment. Dr. Hardie, of the 73d regiment, though by no means a violent mercurialist, stated, 'that the worst cases of tertiary disease which had come under his notice were of the class which had not been treated;' and the late Sir William Lawrence mentioned, 'that he had seen sores which had been left alone; but his experience of them had not at all induced him to repeat the experiment.'

It appears from these numbers that the majority, though admitting that the disease, if left alone, would eventually die out, were, nevertheless, decidedly in favour of some specific treatment, not necessarily mercurial. I believe the experience of most medical men must have led them to the conclusion, that if a mild case of syphilis be left alone, it will ultimately die out. But I very much doubt if any of us have the power, in the early stages of the disease, of deciding how baneful will be the effects of the poison on the system. What would prove a small dose for one person might be a deadly poison for another. To say the least of it, the process is a lingering one; and the greater part of the evidence shows that the results have been anything but satisfactory. I cannot, therefore, advocate the 'do-nothing' method, as the experience of others leads me to the conclusion that we have better results from some specific course of treatment.

We will now inquire into the results of the abortive plan of treatment. On this point thirty-three witnesses gave evidence. Of this number, ten were in favour of it,

and twenty-three objected to it. Amongst the first ten will be found the names of surgeons whose great experience and powers of observation must give great weight to their opinion. The late Sir William Lawrence stated, that 'he would have a good opinion of secondaries not taking place after abortive treatment had been adopted, if he saw the sore within four days;' and Mr. Paget was of opinion, that 'he should use it in any case that came to him within the first two or three days.'

On the other hand, the twenty-three witnesses who gave evidence against this plan of treatment considered it useless, as cases did not present themselves early enough for the knife or escharotic to be of use, as the system was, in their opinion, already contaminated; and the majority of them had seen bad secondary disease follow. Mr. Henry Lee, in his work on *Practical Pathology*, explains clearly why the abortive treatment should not be successful. In true syphilis he shows that there is a period of incubation lasting an uncertain time, and that therefore the system may have become contaminated before any evidence is given of what part has received the poison. Under such circumstances, removing or destroying the local lesion would be useless.

I believe there is a period when both the removing and escharotics are useful. When speaking of the pathology of the disease, I asserted my belief that in all infecting chancres there was a characteristic condition of the lymphatic glands. If a patient presents himself with a sore accompanied with amygdaloid enlargement of the glands, I believe the time for the abortive treatment has gone by, as the whole system is then contaminated; but if, on the contrary, there be no gland-complication, I should attempt complete destruction of the sore, with a conviction that by so doing I should prevent secondary consequences.

Our last point of inquiry is with regard to the results of the treatment by the so-called method of syphilisation. Fourteen witnesses only mention the method in their evidence; and of this number, three only could speak with any experience in the matter. Two of these were foreign

surgeons—Professor Wilhelm Boeck of Christiana, and Dr. Bidentkap, surgeon in the Norwegian army. The third witness was Dr. Patrick Heron Watson, surgeon to the Royal Infirmary, Edinburgh. The first of these witnesses stated that he had pursued the treatment by syphilisation for thirteen years. When he had a patient with constitutional syphilis, but only in that case, he took the pus from a primary sore in another person. His method was to make a series of inoculations on the trunk of the body; and when a state of immunity had been reached in this part, he proceeded to inoculate the extremities, and continued them until a like result was obtained. His theory was, that by inserting the syphilitic virus into an already contaminated system, the original disease was stimulated; which enabled it to pass through its regular course in a far shorter time than if left to itself, or if subjected to any other mode of treatment. He stated in his evidence, that 'he never believed that it would be possible to obtain such a mastery over the syphilitic disease as he had with syphilisation.' Relapses had proved to be very seldom the case. At the time he gave his evidence he had treated 429 cases; and out of that number, only forty-five had come back with relapses. The usual time allowed for the whole treatment was three months and a half. One point Professor Boeck insisted on, viz. that syphilisation did not answer nearly so well in those cases in which mercury had been previously used systematically.

Dr. Bidentkap, who had learnt the plan of treatment from Professor Boeck, and who had subsequently carried it into effect in the Norwegian army, corroborated the statements made by the Professor, and also stated that he had never had a relapse among his private patients.

At the time when Dr. Heron Watson gave evidence before the Committee, he had practised syphilisation for three years, and he had found the results to be remarkably satisfactory. His plan of treatment was precisely similar to that of Professor Boeck, so far as inoculation was concerned; but he did not employ matter derived from an irritated indurated chancre, as the Professor did.

0.104/r.c.
but not used
in the cases.

the same
as the

He used matter from a soft sore, and considered that the *modus operandi* was by acting as an eliminant of the poison, which is somehow stored up in the system. His experience went to show that relapses in patients who had been what is termed syphilised were of rare occurrence.

Dr. Watson has been kind enough to give me the result of his experience since the period when he gave evidence before the Committee. He states; 'that he has never had any bad results from syphilisation; that although the sores have sometimes assumed large proportions, even as large as a florin, still he has had no suppurative lymphatics or buboes. Relapses have been infrequent, excepting in those cases where mercury had been previously used;' thus bearing out Professor Boeck's assertion.

Since the printing of the Report on the venereal disease, some most interesting experiments on this method of treatment have been made by Mr. James Lane and Mr. Gascoyen at the Lock Hospital, and they were made under the personal superintendence of Professor Boeck, and are published in the fiftieth volume of the *Medico-Chirurgical Transactions*. From their report it appears that twenty-seven cases were placed under this plan of treatment. Twenty-two had not previously taken any mercury, and five had undergone a mercurial course. Six had not been heard of since their discharge from the hospital, but ten had remained under observation. Of this latter number, eight had remained perfectly well, and two had returned again; one with a slight relapse, and the other with a slight ulceration on the labium; but they were both quickly cured. In the remaining six the treatment had not been persevered in to the end. In the five cases who had previously taken mercury the results do not appear to have been at all satisfactory. The time occupied in the treatment of those who had not previously taken mercury varied from six weeks to eight months and seven days; in the mercurial cases, from three months and nineteen days to seven months and twenty days.

The results of these experiments led them to the conclusion, that syphilisation was not a treatment that could be recommended for adoption. Their objections were, its tediousness, painfulness, and life-long markings which it entails on the patients. Mr. Lane was of opinion that syphilisation did exert some beneficial and specific influence over the disease; while Mr. Gascoyen, on the other hand, believed that the cure depended on the tendency to recovery, which an early and uncomplicated constitutional syphilis exhibits with the lapse of time, and under circumstances favourable to the general health. Mr. Henry Lee, in his work on *Practical Pathology*, has gone carefully into this subject; and has arrived at the conclusion that syphilisation so called is merely depuratory in its action on the skin excited by successive inoculations. I have myself no experience in this method of treatment; but I cannot help thinking that there is still a great deal to be learnt about it, and that it is a subject worthy of much farther investigation.

I have attempted in these few pages to gather, from the vast amount of evidence with which the Report furnishes us, some of the conclusions which it suggests on the pathology and treatment of syphilis. It will be seen that unanimity of opinion is not its characteristic feature; but I believe that the subject is becoming much better understood, and the treatment therefore based on sounder principles. In addition to the two subjects I have considered, a great mass of evidence is adduced in the Report on the Prevention of Syphilis, which is a matter that at the present time is occupying the attention of the public at large; and my only reason for not touching on it in this paper is the extent of the subject.

EDGCOMBE VENNING.

VI. ON SCROFULA.

IN a paper in the last volume of these *Reports*, I alluded to the undefined manner in which the term 'scrofulous' is frequently applied to diseases, and to the confusion which exists with regard to its meaning; and I gave reasons for believing that, although there are doubtless some cases of chronic bone and joint disease which are manifestations of scrofula, the great majority of them are in no way connected with that disease. Since then, farther observation has confirmed me in this opinion; and I believe that one reason for the prevalence of these cases of chronic disease, is the neglect of active treatment when they are in the early stage, owing to their being looked upon as of a scrofulous origin, and therefore as belonging to a class of diseases to which such treatment is inappropriate and mischievous. If this be the case, it is of some importance that we should have a definite idea of the symptoms of scrofula, and be able to distinguish between cases which are, and others which are not, of a scrofulous nature. This has been rendered the more difficult by the custom, which has been very prevalent, of speaking of scrofula as some mysterious influence, rather than as a definite disease; and using the adjective 'scrofulous' without deriving it from any existing substantive. Thus many surgeons have been in the habit of applying the epithet 'scrofulous' to almost every case of chronic joint-disease, even though the subject of the disease may exhibit no other mark of scrofula whatever; which, it seems to me, is as erroneous as it would be to call every case of keratitis or periostitis syphilitic. For scrofula is, I believe, as distinct a disease as syphilis or ague, although perhaps less easy to define. This, however, depends somewhat upon the kind of definition required. It has

been the fashion lately to define almost all diseases anatomically, owing to the great attention that has been bestowed upon, and advance that has been made in, morbid anatomy. But although I would not for a moment depreciate the value of morbid anatomy, I would strongly urge the necessity of making our definitions of disease as far as possible clinical. By all means let us remember what hidden morbid changes are ordinarily associated with the outward and visible signs of disease; but let us also remember, that before we can verify our estimate of those changes, the patient is usually beyond the reach of our art; that we have to study and treat *disease* in the *living* subject; that morbid anatomy shows us only its causes and effects. It is the more necessary to bear this in mind, because medicine is an art and not a science; and we are so far from knowing with any scientific accuracy, either the material we have to deal with, or the laws which govern its life, that it is but futile and deceiving to attempt any scientific definition of diseases, although very necessary to have some readily-applicable means of recognising their manifestations. For this end I would describe scrofula (taking Virchow's chief notes of the disease, vulnerability and pertinacity) as a disease of children, which manifests itself by a peculiar vulnerability and proneness of the subject to chronic inflammations of the mucous membranes and skin, lymphatic system, and bones; which inflammations are characterised by great pertinacity, and the products of which have a retrograde tendency.

I. It is a disease of children; and its power over the subject becomes less as age increases. Hunter had evidently observed this, for he remarked that 'puberty often produces a cure.*' It is most prevalent from the age of three to nine years; but its ravages are of that kind, that it often leaves a lifelong mark of its previous existence.

II. Its progress is slow, but its manifestations are excited by very slight causes (vulnerability); and when excited, are difficult to get rid of, till the patient is past

* *Works*, by Palmer, vol. i. p. 601.

the age during which he is obnoxious to it (pertinacity). Thus in a scrofulous child a slight irritation will produce an obstinate eczema or diarrhoea, or a trifling blow a persistent inflammation of a bone; until he arrives at puberty, from which time he becomes less vulnerable.

III. The products of scrofulous inflammation have a retrograde tendency. They tend to molecular death—that is, to ulceration; and to the fatty and the caseous degenerations. Scrofula is by far the most common cause of the caseous formations so frequently found in the lymphatic glands, lungs, and bones; and which used to be erroneously called tubercle, but which are for the most part degenerate products of inflammation, and precisely resemble the cheesy masses often left by the subsidence of a scrofulous abscess. These masses may remain for indefinite periods without causing any mischief to the surrounding tissues, becoming themselves more and more shrivelled as time goes on; but occasionally they act as foreign bodies, and, at some period of their existence, set up an irritative action or inflammation of the tissues in which they occur, which leads to circumferential abscess and their own softening and expulsion, though often at the expense of considerable destruction of the neighbouring parts. These are the cases which have been described as masses of tubercle causing inflammation and abscess, but are really of a scrofulous and not of a tubercular origin. Some authors, however, still believe tubercle to be the essence of scrofula, and attribute all the changes that occur in this disease to the presence of tubercle. It is notable, however, that these authors all describe the inflammation as the first stage in the process, and admit that no tubercle is to be found in the early periods of the disease; and, moreover, that the inflammation may entirely subside, and leave no trace behind.* How this is compatible with their being ‘the result of a previous deposition of tubercle,’† I confess myself unable to under-

* Savory, in Holmes's *System of Surgery*, 2d ed. vol. i. pp. 352, 368; Stanley, *Diseases of Bones*, pp. 246, 250. I have treated this subject in connection with diseases of the bones more fully in vol. iv. of these *Reports*, p. 150.

† Savory, *op. cit.* p. 367.

stand. For if these inflammations are caused by a deposit of tubercle, we ought to find tubercle even in the earliest stage of their progress; and even if the inflammation subside, we ought to find the tubercle which caused it. But the caseous deposits of scrofula are only found in its later stages; contrasting thus with cases of true tuberculosis, in which the more rapid the progress, and the earlier the fatal end, of the case, the greater, as a rule, is the amount of tubercle found. How different, too, is the progress of the two diseases! Scrofula tends to wear itself out, and to disappear with the increasing age of the patient; whereas the steady progress of tuberculosis is but too well known. Scrofula also does not appear to be hereditary. At the Hospital for Sick Children I am constantly seeing wretchedly scrofulous children brought by perfectly healthy parents; and although I do not think statistics of much value in a question of this kind, I may mention, that on inquiring in twenty consecutive cases of scrofula brought to me, in only one was either of the parents said to be in any way unhealthy.

How
g. hereditary?

It is said by those who argue for the identity of scrofula and tuberculosis, that persons who have in their youth been the subject of scrofula, often become later in life affected with tuberculosis. This I believe to be the case only in a minority of instances; yet it occurs sufficiently frequently to suggest a possible connection between the two diseases;* to which question I will briefly allude. It has been shown by the recent interesting experiments of Villemin, Wilson Fox, Sanderson, and others, that tubercle can be produced in some of the lower animals, especially the rodentia, by the subcutaneous inoculation of various morbid materials, and even by the irritation of inert substances placed under the skin. Now the essential element of tubercle is a material which consists of lymph-like corpuscles, held together by a network of hyaline connective substance; and to this Dr. Sanderson has given the name of adenoïd tissue, because it exactly resembles

* The chief reason, however, for the belief that has prevailed of the identity of tubercle and scrofula has been the supposed tubercular nature of all caseous formations.

the tissue of certain follicular organs belonging to the lymphatic system—the follicles of Peyer, the ampullæ of lymphatic glands, &c.; and for the same reason Virchow calls tubercle a ‘lymphoma.’ And Dr. Sanderson has shown,* that in all the positions where tubercle is developed, there exists naturally this adenoïd tissue, and that tubercular lesions are the effect of an overgrowth of this tissue. This adenoïd tissue, first described by Kölliker, and elaborately investigated by Professor His of Basle, who gave it the name, is in intimate relation with the lymphatic system, and is found in the lymphatic glands, the spleen, around the liver ducts, around the bronchi, in the serous membranes (which we now know to be great lymphatic reservoirs) forming sheaths around the vessels, and microscopic masses under the epithelium, in the alimentary canal as a layer in relation with the submucous network of lymphatic channels, and in the medulla of bone. An examination of the lesions produced in animals rendered tubercular by inoculation showed that in the peritoneum the tubercular granules are simply outgrowths from these adenoïd sheaths; in the lung the granulations consist of overgrowth of the peri-bronchial adenoïd tissue, and thickening thus of the alveolar walls, with collection in the alveoli of the alveolar cells; in the liver they are similarly overgrowths of the adenoïd tissue round the bile-ducts, and of the natural epithelium within the ducts; in the spleen there is overgrowth of the adenoïd pulp, causing hypertrophy; the lesions of the skin consist of adenoïd granulations, surrounded by a capsule of connective tissue; their relations to the lymphatic system are not yet clearly made out. Now these last are the foci from which the disease is disseminated in the body by the lymphatics and veins; from which it appears, that all which is necessary for the production of tubercle is an adenoïd growth, as a focus from which the dissemination of the disease takes place. Now it seems to me, that this adenoïd growth may be excited by various causes, and thus that tubercle may originate in several ways.

* *Tenth Report of Med. Off. of Privy Council*, p. 111; *Eleventh Report*, p. 91.

1. By a morbid condition of the blood, which there may be a hereditary tendency to produce. To this, perhaps, I might add a hereditary susceptibility on the part of the lymphatic system.

2. By inflammatory or other changes in the blood-making organs, thus altering the character of the blood; and, by inflammation (leading to adenoïd growth), of the affected organs themselves.

3. By improper or insufficient food, or unhealthy conditions of life, which give rise to alterations of the circulating fluid, and thus furnish the requisite irritation.

4. Traumatic causes :

α. Injury, such as the insertion of inert substances under the skin, setons, &c.

β. Inoculation, especially of the tuberculous material itself.

These last two, it will be observed, both furnish the necessary lymphoid foci for the dissemination of the disease, and thus explain its production by various materials, and the greater virulence of the infection produced by tubercle itself. Bearing, then, these facts in mind, I would suggest whether the connection of scrofula and tubercle may not be this: that the caseous and other inflammatory products of scrofula may originate the adenoïd growth—which is the essence of tubercle—in the same way as the setons and other materials in the experiments alluded to; and that scrofulous inflammation may thus be one of the causes of tuberculosis.

IV. The symptoms indicative of scrofula. These are a peculiar vulnerability and proneness of the subject to chronic inflammations of the mucous membranes, skin, lymphatic system, and bones, several of these usually occurring together, or within a short period, in the same patient. This will best be illustrated by the relation of one or two cases; for instance :

R. A., a boy *æt.* 3, was brought to me with eczema of two months' duration on various parts of the body. He had besides, phlyctænular ophthalmia of both eyes, with much photophobia, which commenced two months ago, and was getting slowly worse; also ozæna of a month's duration; and enlarged cervical glands, which had been noticeably

prominent for three months. The lips were swollen and the edges fissured. He had always been liable to cough, but with that exception, had been in fair health for the first two years of life. There was no suspicion of syphilis; the parents were both healthy.

Another case. F. P., a girl *æt.* 6½, came with phlyctænular ophthalmia, of which she had had two former attacks when two and four years old, each of which lasted many weeks. She had also enlarged submaxillary and cervical glands. A year previously she had been under treatment for caries of the ulna following a slight blow. Parents healthy.

A third case. A. R., a girl *æt.* 7. She has phlyctænular ophthalmia and eczema of face and neck, with enlargement of the cervical glands, all of three months' duration. Since eighteen months old she has been constantly liable to cough and diarrhoea.

These cases, which have not been selected, but taken consecutively as they were brought to me, and which might be indefinitely multiplied, all rapidly improved under treatment.

Now if we consider the associated symptoms of scrofula, we shall see that they are all manifestations of the same morbid process, differing only with the difference of the tissues in which they occur. Thus, the same irritation which produces the catarrhal symptoms when affecting the mucous membrane of the eyes and nose (and which in these parts leads, when it has become chronic, to phlyctænular ophthalmia, keratitis, and *ozæna*), produces, when it attacks the bowels, a similar catarrh or diarrhoea; or, in the lungs, a bronchitis or pneumonia. All these consist of a hyperplasia of the cellular elements of the affected tissue, which elements, being multiplied on a free surface, are cast off by an accompanying catarrhal flux. The same thing occurring on another free surface—the skin—causes an eczema, which might be described as a catarrh of the skin. If, however, this increase of cell-elements occurs in a lymphatic gland, the result is different, simply because they cannot escape, but collecting in its interior, give rise to the swelling characterising inflammation of these organs. Again, the affections of the bones connected with scrofula are such as are characteristic of chronic inflammation; slowly-increas-

ing swellings—molecular caries—occurring either on the surface or in the substance of the bone; or the caseous infiltrations, which are the result of the degeneration of the multiplied cells. The way in which the manifestation of this process is influenced by the nature of the tissue it affects is well seen in the ophthalmia of scrofula, where the increased cell-growth leads, on the free surface of the conjunctiva, to catarrhal discharge, but in the substance of the cornea to opacity of its texture. It will be seen also, that the same kind of treatment is beneficial in all these scrofulous affections; which I will now consider a little more in detail.

a. Of the mucous membranes. These are, of all the tissues of the body, the most commonly affected by scrofulous inflammation. Nothing is more common in scrofula than the constant liability to chronic catarrh. The children, as their parents say, 'are always catching cold,' either in the eyes or nose, or throat or chest, or are frequently attacked with diarrhoea. A scrofulous child, now seven years old, and whom I first saw four years ago with inflamed lymphatic glands, is periodically brought to me every few months with catarrhal inflammation of the nose and eyes, which renders him quite ill for the time. This child is nurtured with the utmost care, and carefully protected from cold or other baneful influences, but has been affected in this way during four years. The symptoms always soon subside under cod-liver oil and iron, and he is gradually becoming less liable to them. This condition is frequently associated with swelled and fissured upper lip and *alæ nasi*, and also with hypertrophy of the tonsils. Obstinate otorrhoea is also common, as are also frequent attacks of diarrhoea and chronic bronchial catarrh; vaginitis in young children is also sometimes of this nature. The ophthalmia of scrofula is characterised by the intense photophobia; it is out of all proportion to the amount of visible disease, which is often limited to one or two minute ulcers on the cornea. These ulcers are always accompanied by a plexus of vessels running to them along the cornea. There is profuse lachrymation, and the edges of the lids are sore and fissured, a condition

which is increased by the great spasm of the orbicularis muscle.

β. Of the *skin-affections*, eczema is the most common, and occurs most frequently upon the scalp, face, and neck. It is often of a very obstinate nature. Impetigo and porrigo are also common, the latter often causing patches of superficial ulceration, especially upon the scalp. Scrofulous lupus is a troublesome disease, not only from its destructive nature, but because of the tendency it shows to recur after healing has been procured. It commences in a small inflamed and indurated spot, which soon becomes superficially ulcerated. This ulceration has a serpiginous tendency, and slowly increases, with a great tendency to break out again after temporary healing. The ulceration is not deep, and is often covered with thin crusts, and when healed leaves a white cicatrix, which often causes disfigurement by contraction. The front of the neck is a favourite position for this disease. I have lately had under my care a little girl in whom a troublesome ulceration of this kind under the lower jaw at each side occurred, in connection with ozæna, otorrhœa, and enlargement of the lymphatic glands, clearly showing its scrofulous nature. Hebra has described a chronic form of lichen, which he states is peculiar to scrofula, and occurs only in the male sex.

γ. *The lymphatic system* is very liable to be affected by scrofula, which manifests itself in this instance by indolent swellings of the lymphatic glands. These swellings are due to proliferation of the cells of the alveoli of the glands, and may subside; or may go on to caseous or cretaceous degeneration of the inflammatory products, with corresponding interference with the blood-supply, and consequent atrophy of the other elements of the gland; or they may end in suppuration.

δ. Scrofulous inflammation of the *bones and joints*, although no doubt sufficiently common, occurs, I have elsewhere shown,* by no means so frequently as has been

* To avoid repetition, I may here be permitted to refer to a paper on this subject in vol. iv. of these *Reports*, p. 145.

by many supposed. About 12 per cent, however, of the chronic diseases of bones and joints in children appears to be connected with scrofula. The most common of these is slowly progressing inflammation of the bone, causing its gradual swelling, with expansion of the cancelli and increase of vascularity. This goes slowly on to softening, caries, or caseous degeneration, and is usually accompanied by swelling of the surrounding tissues. The spongy bones, and the cancellous ends of the long bones, are specially liable to this form of inflammation; and as these bones are usually associated with joints, the mischief frequently spreads to the other articular tissues. It is for this reason, that in most of the really scrofulous joints the bones are found extensively softened and diseased; whereas in the cases of chronic inflammation occurring in the joints of otherwise healthy subjects, and having generally a traumatic origin, the soft structures are chiefly affected, the bones often presenting an almost healthy section.

V. The *treatment* of scrofula. This must be both general and local. The general, which is infinitely the most important, consists in favourable hygienic conditions, sea-bathing, and the administration of cod-liver oil and iron. The local will of course vary with the position and manner in which the disease shows itself. The catarrhal affections of the mucous membranes all improve wonderfully under cod-liver oil and iron, which may be given even to those liable to diarrhoea, as soon as that symptom passes off. Very minute doses of rhubarb and soda, or of sulphuric acid in calumbo infusion, or of gray-powder, according to the condition of the motions, will generally arrest it, when the cod-liver oil may be cautiously commenced and gradually increased. Weak astringent injections, frequently changed, should be used in the cases of otorrhoea and ozæna; and care should be taken to protect the parts over which the discharge flows (as, *e.g.* the upper lip in ozæna), by smearing them with zinc ointment or some unirritating salve.

And I may here be permitted to allude to the necessity in all cases of scrofula of attending carefully to the state

of the digestive organs, which are often deranged, and the neglect of which may prevent the full benefit being obtained from the cod-liver oil, or even render the patient quite unable to digest it. One frequently sees children, who are said to be unable to digest the oil, who, after a little attention to the digestive organs, with care as to the mode and time of its administration, are able to take it perfectly well. This is of no small importance, when we consider the great benefit to be obtained from this medicine. In the ophthalmia of scrofula, the oil and iron are our chief remedies. In no disease is the effect of these medicines more rapid and striking; but recovery may be very much aided by the use of very weak alum lotions, and the occasional application of blisters, not larger than a sixpence, to the temples or behind the ears. The edges of the lids should be smeared with olive-oil at night.

For the skin-affections a stimulant treatment is generally best locally; in the pustular eruptions quinine should be given with the cod-liver oil; and for the porrigo, which is often so troublesome, I have obtained great benefit from an ointment consisting of fifteen grains of the red oxide of mercury, with half an ounce of olive-oil, and the same quantity of lard. This I learned from the late Dr. Hillier. For the serpiginous ulceration, the iodide of lead ointment is an excellent application. The enlarged glands should be left alone. I am sure that poulticing, and painting with iodine, do harm. If they suppurate, and the skin is evidently becoming thinned, a very small puncture may be made, the matter gently squeezed out, and slight pressure made by a pad of lint fixed on each side of the opening with strips of plaster. For the affections of the bones and joints the same general treatment is required. For the local treatment of the caries of scrofula I have found the application of sulphuric acid, introduced by Mr. Pollock, exceedingly useful, as it promotes the rapid separation of the diseased bone without the gouging and scraping, which, as might be expected, so often only set up fresh mischief.

In all cases of scrofulous bone and joint disease the limb should, if possible, be so arranged in splints as to allow of the patient being taken out of doors for fresh air.

J. WARRINGTON HAWARD.

VII. ON RECURRENT INSANITY.

AMONG the many strange notions and prejudices which prevail on the subject of insanity, there is one which, however extravagant it may seem at first sight, is to some extent explained, if not excused, by certain phenomena not unfrequently to be observed in insane patients. An idea is entertained by some, that a man or woman once insane is always insane; that the apparent restoration to health which happily results in so many cases is nothing but a lucid interval—a short and seeming recovery, and that no reliance is to be placed upon it. In old times the care of lunatics consisted in domiciling them for life in places of safe custody. The madhouse differed in no respect from the prison, and treatment and cure were lost sight of in the efforts made to restrain the violence of the inmates by every method of ingenuity. The fact that lends some ground to this prejudice is, the recurrence of insanity in various patients after a longer or shorter interval of reason; a phenomenon of the highest importance legally, and of great pathological interest, but one not yet explained. For the explanation we must study the physiology of the nervous system, as displayed not only in insanity, but in many other disorders.

Recurring or remittent mental disorder may vary greatly in the duration of the interval of sanity; yet it may recur with considerable regularity through a long series of years. An enumeration of a few cases of this kind will not be without interest. The interval may be one of years:

An old man used periodically to come under my care who had had recurrent attacks of mania throughout a long life. I first saw him in 1858, his age being then eighty-one; the attack was stated to be his twenty-seventh, the first having commenced when he was eighteen. He had always been brought to the same asylum, and the records contained a history of his life; some of the officials too were old enough to have recollected him the greater part of the time. He was always discharged

as 'recovered;' and at the time I speak of, if not always, he paid his account himself before leaving, and drove home some twenty-five miles in a carriage. In his younger days he had been a very violent and dangerous patient, and on one occasion came to town in a carriage-and-four, armed with a double-barrelled gun, with which he threatened to shoot the post-boys if they drove anywhere save to Buckingham Palace. Of the intervals between the attacks I can give some account so far back as the year 1832. He was admitted in that year, and in '36, '39, '43, '48, '51, '51, '53, '54, '56, '57, '58, '59, the intervals becoming shorter as life advanced. He was, when I first saw him, very noisy and maniacal, with various delusions—one, and that persistent, being that he was married by proxy to a noble lady who lived near him. This, I believe, he never lost, even at the time when he was discharged as recovered; he kept it, however, to himself when convalescent, and it was not heard till he again showed marked symptoms of insanity.

This case presents several interesting features, and suggests certain questions which have to be considered not unfrequently in dealing with patients of this kind. In the first place, are such persons to be considered recovered when the acute attack subsides, when from previous experience we know that the interval between it and the next will be but brief, and when there may possibly be still some delusion or eccentric opinion left, a relic of the mental disturbance not altogether removed, perhaps irremovable? Secondly, how far, for the ordinary purposes of life, are they to be considered of sane and responsible mind, of sound mind, memory, and understanding, and able to take care of themselves and their affairs?

The first I hope to be able to illustrate by other cases, which will tend to prove, that such patients are greatly benefited by removal from an asylum so soon as they are sufficiently convalescent to admit of its being done with safety. The second is one which can only be argued in view of the particular case, and of the particular act which the patient is called on to perform. Thus, I hold that this old gentleman was, when he was discharged, quite capable of giving evidence as a witness, or of managing or selling property; but that he was incompetent to make a will; for, always considering himself married to Lady C—, any will made by him would, we may suppose, bear traces of this idea. Although he outlived all his relations, and left no near kin to inherit the farm he owned, he

never made a will, nor did any one ever venture to urge his so doing; and his land passed to one whose claim was very doubtful, but who, in default of others whose title was better, became the unquestioned possessor.

A gentleman had periodical attacks of mania for several years, who nevertheless recovered on each occasion, and finally died at home of general decay, but not insane. His illness commenced, in the first instance, with an epileptic fit consequent upon a blow on the head. He did not, however, continue to have epileptic attacks, but the neurosis seemed to have been transformed from epilepsy into periodical attacks of mania. The accident happened in 1855, and in 1856 he was admitted for the first time into an asylum. He had a second attack in 1858, another in 1859, a fourth also in 1859, one in 1860, and another in 1861; and he died, as I have said, not insane, in 1863. This gentleman's insanity was shown in violence and threatening language towards his wife, in giving reckless orders to tradesmen for articles beyond his means, and in boasting of his position and greatness. He was on several occasions acutely maniacal, and even delirious, but delusions were not a marked feature in his case; and when the excitement subsided, he might have been pronounced recovered, and was, beyond all question, a responsible agent, competent to transact business of any kind. Both these patients—at any rate, while I knew them—were conscious of their disordered state, and offered no opposition to those who brought them back to their former quarters.

There may not appear to be anything remarkable in patients having periodical attacks of insanity at intervals of two or three years; and if the interval be still longer, we may be disposed to look upon them, not as the symptoms of one continuous disease, but as repeated yet distinct invasions of the malady. That it must not be so regarded seems certain from the history of cases which are to be found in almost every asylum, where the interval is so short, that the patient is not removed from restraint at all, but passes his life in periodical insanity and comparative sanity; the latter becoming more and more dimmed by the constantly recurring paroxysms, but the periodicity being preserved, it may be, for very many years. In one instance it had continued for upwards of twenty years. The mental state of the patient had been reduced to dementia; but the periodical maniacal state of excitement recurred ever with its old regularity. Another gentleman, who was for ten years under my observation, passed the whole of this time in alternations of very

marked mania and comparative sanity. He was one of those who 'hear voices;' and at the time of the attack his doings were entirely regulated by what he heard the 'voices' say; and he, for this reason, constantly refused his food, would remain on his knees all night if allowed, and was quite incoherent in conversation. Yet when this passed away, he was so rational, that for years it was a question whether he would be pronounced insane by a jury. His affairs, however, necessitated a commission *de lunatico inquirendo*; and when the jury saw him, his state was but too apparent, as the anticipation of the event had brought on a very severe attack. The attacks in this gentleman's case being so frequent, and the intervals comparatively short, it was impossible to discharge him as recovered at the end of each; though, as I have said, he became quite rational, walked beyond the premises, and went with his attendant to many of the sights of London. Had he been discharged, he would in all probability have placed himself beyond the reach of his friends, and in his attack might have come to serious harm. But the good so often effected by change of scene in this intermitting insanity was exemplified here as markedly as in many other cases that have come under my observation. Every summer he was sent into the country for three or four months. He greatly enjoyed this; used to take very long walks, and explore the whole neighbourhood of the place where he chanced to be. Without fail there was an alteration in the attacks, which were far less severe and at much longer intervals. When in the asylum, he refused his food often for days together; his nights were sleepless; and at the height of the attack he was at times perfectly incoherent and furiously excited. When away in the country, the interval between the attacks was at least of three times the length, and the attack itself was of a very much milder type. He did not refuse his food, the nights were much better, and the whole passed off much more rapidly. Had he not had every summer this change of scene, I believe that he would soon have advanced to a stage in which, even in the interval, there would have been no semblance of sanity. After being in

the asylum for seven years, he was removed altogether to the country, and, I believe, has improved in consequence.

A gentleman, æt. 34, was admitted into an asylum in a somewhat acute attack of melancholia on the 10th of July 1867. He had many delusions connected with religion, and obstinately refused food, so that it was necessary to feed him by force. He gradually got better, however, and the symptoms all passed away; so that he was apparently convalescent and in his usual state of mind. After a short period of apparent sanity the whole recurred; and by August 17th he was in a state of the same melancholy, and refused his food as before. Again the same convalescence took place, and by the 3d of September he might have been pronounced recovered. By the 24th September he was in his former state; by the middle of October it had passed off; and on the 22d October, the report is that he appeared quite well. Yet on the 29th he was as bad as ever; and it was not till November 26 that he was again convalescent. On December 10 he relapsed into melancholia, and on this occasion had a very severe attack; yet he had recovered by the end of the month, and on December 31 was pronounced quite well. To be brief, he relapsed on or about January 14, 1868, and had again recovered by February 4; broke down on February 18, had recovered by March 3. Subsequently his attacks recurred on March 16, April 14, and May 13. The dates I have given are those of the height of the attack of insanity, and of the time when he was apparently most recovered; but the former did not occur quite suddenly like an epileptic attack, and during a few days he gradually lapsed from the sane into the insane condition, from which again he gradually emerged. On the 4th of June he was sent to the seaside, though the proceeding was looked upon as very hazardous, owing to the shortness of the intervals which had latterly existed between the attacks; for it will be observed, that the period from the height of one to that of another had been less than a month, and consequently a very small portion of the intervening time had been passed in a convalescent state. He passed two months, however, at the seaside without the slightest recurrence of the melancholia, and during this time it would have been impossible to detect anything in his conduct which would have justified certificates or legal restraint, had his previous history been unknown. He went where he liked, and remained quite voluntarily. Circumstances, however, caused his return to the asylum; and almost at once his malady returned, and assumed its former regularity, till he was again sent away; since which time, though the attacks have not left him, they recur, as I am informed, at long intervals, and are far less formidable in character. When last heard of, he was living at home with his friends, and had had no attack for five months.

The most violent case of acute delirium that it was ever my lot to treat occurred during the great heat of July 1868 in a young lady, æt. 28. There was in her family a history of various neuroses, and she herself was an example of the conversion of one neurosis into another. She had suffered for some time from neuralgic pain in the spine, which she described as being of a very acute character. This entirely left her,

and then various abnormal mental symptoms made their appearance, and culminated in the acute delirium for which she was admitted on July 18 into an asylum. Days and nights she passed without sleep; in eight days she only slept one hour; but at last sleep came, and with it amendment. She began gradually to improve, and thenceforth her progress to convalescence was like that of any other patient. By the middle of August she had become quite rational, talked freely about her illness, saw her friends, and was on the point of leaving to join them, when she again felt the neuralgic pains she before complained of. After some little time these left her, then the delirium recommenced, and she went through another attack little, if any, less severe than the preceding. This subsided in the same way, and she gradually mended, till, on the 14th September, it was recorded that she appeared quite well. By the 25th of September, however, she was in another attack, having also previously complained of the neuralgic pains. This, too, passed away somewhat more rapidly, and on the 9th of October she was again convalescent; again to break down on the 19th. She did not fairly recover from this seizure till quite at the close of November, but on December 1 it is recorded that she seemed quite well. On December 3 she was ill again; on January 1, 1869, she was well. On January 5 she was very maniacal; by January 24 she was again well. It was now clear that she was not improving, or likely to improve, in the place where these attacks were recurring with such frequency and regularity, and it was determined to send her away for change. Accordingly she was removed to an asylum at a great distance, with the most favourable result. So far as I am aware, there was no recurrence whatever of the attacks; at any rate, there had been none when last I heard of her, which was at least a twelvemonth after her removal. She remained a certain time in the asylum, and then rejoined her sister, with whom she was living when information reached me concerning her health.

Another case was that of a gentleman who was admitted into an asylum on April 6, 1870, having had previously two attacks of acute insanity, which, however, had passed off in a few days. He was most violently excited on this occasion, making most determined attempts at suicide with everything that he could reach, trying to tie all kinds of things round his neck, and tearing at his throat with his finger-nails till the skin was abraded. He too refused his food, and force was necessary to compel him to take it. He had delusions without number, and heard voices commanding him to make away with himself. He was as violent towards others as towards himself, attacking the attendants 'in order to provoke them to kill him.' The attack lasted in this intensity for about a week. Sleep was procured by full doses of the hydrate of chloral; and then gradually convalescence followed. Hopes were entertained that this attack would pass away like the former, which had taken place a twelvemonth before. Accordingly, so soon as the patient appeared well, he was allowed to go home upon 'leave of absence.' In two days he came back of his own accord; and in a few more the former symptoms returned with nearly the same

severity. They again passed off, and he appeared perfectly rational by the 20th of May, occupying himself with painting—for he was an artist by profession—and going daily beyond the premises to the various exhibitions and sights of London. By the 30th of May he was in another attack; which passed away quickly, and by the 9th of June he was again pronounced recovered. He gradually, however, declined; and by June 25th he was again in an attack, from which he emerged about the end of the month. No sooner was he well, able to see his friends, to go about town, and to occupy himself with his profession, than he once more lapsed into delusions, hallucinations, and determined attempts at suicide, and so dangerous was he, that restraint was used to prevent him from injuring himself. To complete the history, he was in an attack on July 4th, recovered by the 14th; to relapse about the 6th of August. He was tolerably well by the 14th, and had again broken down on the 26th. Immediately he came out of this attack he was transferred to another asylum in a distant part of the country: and the effect of this change was striking; for although he had only been free from the symptoms of the disorder for about a fortnight at a time during some months, he had had no attack after his removal up to the time when last I heard of him, which was a period of quite two months. So well was he, that the authorities of the asylum considered him recovered, and urged upon his friends that he should be discharged and set completely at liberty. It is too much, I fear, to hope that the recovery will be permanent. But this and other cases serve to show the effect produced, in an apparently hopeless and desperate case, by change of scene and surroundings.

When we try to explain the pathology of these singular phenomena of recurring reason and insanity, we are at once driven to confess how little we know of the latter. At regular intervals—so short as once a month—a patient presents all the symptoms of the most acute and violent insanity, so as to cause the utmost anxiety for his safety and life; and a return to sanity so complete, that he might mix with the world without any one discovering that he was or had been of unsound mind. Speculations as to probable pathological changes in the brain and its membranes fail in indicating the conditions under which this alternation occurs; and we can only conjecture, by the analogy of other neuroses, that something takes place which interferes with the proper function of the part, but which is capable of being removed without any serious lesion. The periodical neurosis which is most readily suggested for comparison is epilepsy. We know what a tremendous disturbance of the brain-function is implied in

a series of epileptic attacks. Such a series may occur at nearly regular intervals, without any assignable cause, and may pass off without leaving any trace in the mental state—at any rate at first. In process of time the mind will become enfeebled, and the sufferer will pass into dementia; yet the epileptic attacks will still recur with periodical regularity, though it may be with greater frequency. So, the periodical attacks of violent mania may recur, till the mind becomes effaced; and instead of the periodical sanity, the interval is passed in quiet and harmless dementia, which, as I have said, may go on to the term of an ordinary life. The connection between insanity and epilepsy, and the possibility of the one taking the place of the other, has attracted the attention of alienists more and more of late years; and not only the connection between insanity and epilepsy, but that between insanity and neuralgia has also been noticed. How nearly epilepsy and neuralgia are allied is illustrated by the disorder to which Trousseau gave the name of epileptiform tic. This attacks its victim in periodical paroxysms, leaving little or no trace at the time when the pain is absent; and, like epilepsy or periodical insanity, is most intractable, and rarely removed by medical aid. Another recurring neurosis which may be mentioned is periodical drinking, so often witnessed in both males and females, which deserves, better than any other form, the title of dipsomania or oinomania. Here for the time the patient appears to be in a state which truly deserves to be called insane; but it passes away, and then he can no longer be legally restrained; and we are obliged to let him go free, unless he voluntarily submits to coercion.

The striking effect produced in several apparently most unpromising cases by change of scene and surroundings, even when the change consisted merely in removal from one asylum to another, is, I think, sufficiently important to be placed on record. Medical treatment here avails so little, that it is worth while to try the effect of change, if only to lessen the frequency of the attacks, and avert the gradual deterioration and decay of mind.

G. FIELDING BLANDFORD, M.D.

VIII. ON DISTRAIN OF THE HEART.

DILATATION of the heart seems to be so generally considered as a chronic disease, requiring some time before its presence is indicated by constitutional disturbances, which are insidious and gradual, that a few instances in which this form of cardiac injury arose suddenly, and from an accidental cause, may be worth recording, if only to call attention to a train of symptoms which at first are very puzzling, and liable to mislead the observer, and of which I have hitherto been unable to find any account.

The fact that a heart will yield to long-continued and excessive exertion is, indeed, popularly recognised; and recently attention has been directed to the results of athletic exercises, which bear closely upon this question.

The form of accidental injury which results from excessive pressure on the valve-strings has been sufficiently described. But is it not possible for a muscular organ like the heart to yield generally and in all directions from the effect of a sudden and undue strain? Or is it the fact that the fibrous coverings of the heart are in all instances a sufficient protection against such an accident? This, I conceive, is not the case. The pericardium, it is well known, can yield to a very great extent. There is a preparation preserved in this Museum which shows the pericardium so distended with fluid as to extend from side to side of the chest, completely masking the lungs when the body was opened. The fibrous investment of muscle can also yield, and that suddenly, as in cases of purpuric hæmorrhage into the substance of muscle, which may take place suddenly to such an amount as to form large tumours. It becomes, then, a question as to the time necessary for the production of such dilatation; and as a very short time is required sometimes for the forma-

tion of an aneurysm of the vessels, so I think the following cases show that a very short time is necessary for the production of an aneurysmal or general dilatation of the heart. It is to this form of injury to the heart that I have given the name 'distrain,' as indicating a special lesion from accidental injury.

The symptoms in these cases are very interesting, as they are likely to draw observation from the injured part to organs remote from the centre of disease; and the patients appear at first to be suffering from intestinal lesion rather than from disease of the heart. The following cases will illustrate this:

A strong well-built labourer, æt. 23, was admitted into hospital on the 13th of March 1868. Six days before admission, after work, he was seized with violent pains below the region of the liver and terminus; but notwithstanding these symptoms, he ate a hearty meal and went to work again. From that time he suffered severe pain, and was brought into hospital in a very precarious condition. He was almost collapsed; cold and clammy; the face blue and congested. He was suffering from orthopnoea: the tongue was dry and furred; he had intense pain in the right hypochondrium below the liver; he was vomiting occasionally. The liver was found to be large; he passed no urine during the time he was in the hospital; the pulse was extremely small and rapid; and the heart-sounds were very hurried and extremely indistinct. I was unable to say if there was any murmur. He had all the aspect of a patient collapsed from intestinal obstruction. At one A.M. on the following morning he was seized with severe cramps in the muscles; and he died at four A.M., after a severe attack of cramps.

At the necropsy the following condition was found. The body was well-nourished and well-developed; the lungs were very much congested and full of black blood; the liver and kidneys were congested; and the stomach and intestines were found in the same condition. The heart was very large, quite uncontracted, and contained a quantity of scarcely-coagulated blood. Both ventricles were very much dilated, and the auricular ventricular openings much enlarged. The mitral valve was found slightly atheromatous. The muscular structure was pale and fatty. The weight of the organ was 18 oz.

Incomplete as is the history of the case just detailed, yet the sudden access of symptoms, and the general condition of the patient, interpreted and elucidated by the aid of other subsequent cases, leave very little doubt in my mind that the dilatation of the heart, which was apparently the centre of injury, must have occurred suddenly. This view of the case is also borne out by the

fact, that the man had been admitted into hospital in the previous January with a slight attack of rheumatism. I had examined him both on admission and on his leaving the hospital, and was unable to detect any disease of the heart.

In the following cases the history of injury is of a more satisfactory kind :

A man, *æt.* 28, was admitted in December with the following symptoms and history. Two weeks before admission he was in good health; but after lifting some heavy weight he suddenly became very ill; and although he did not faint, he sweated profusely, and was seized with acute pain in the region of the heart and down the left arm. Notwithstanding this, he went to work; and continued at work up to five days before admission, when he became very much worse, suffering from vomiting and cardiac pain. He had spit blood since the injury.

On admission on the 29th of December, he was in a very dangerous condition, with a look of much anxiety; in much pain, especially about the abdomen; constantly vomiting and retching, and suffering from intense thirst. The pulse was very irregular and feeble. His chief distress was the abdominal pain. A loud blowing murmur was heard over the base of the heart from the sternum to the line of the left nipple, and more or less over the whole heart's surface; and this organ was evidently very much dilated. A very marked thrill was perceptible between the third and fourth and the fourth and fifth ribs, from the sternum to the left nipple. The apex-beat was between the sixth and seventh ribs. The liver was very large; the belly distended; and the urine was dark and albuminous; pulse 108. He became semi-comatose on the 30th, and made attempts to scratch his heart, as if from pain. He died on the morning of the 31st.

On examination, the organs were found much congested. The heart was much dilated, the ventricles being very much thinned, and the auricles being even transparent in places; the auriculo-ventricular openings were very much enlarged, the left admitting five fingers, the right six. The structure was soft and fatty. This patient had all the appearance of a man suffering from severe intestinal obstruction. The constant vomiting and retching, and the severe abdominal pain, seemed to point to injuries far from the real centre of disease.

A girl, *æt.* 19, was admitted in February 1869 with the following symptoms and history. On the morning of the 8th of February she walked rapidly from Fulham to Camberwell, having been previously in health. At half-past one in the afternoon of the same day she was seized with acute symptoms: violent pains in the bowels and back, and frequent vomiting. She did not complain of pain in the region of the heart. She was very ill when admitted: her lips were blanched; her cheeks much flushed; pulse very small and running, 136 in the minute. She suffered from intense thirst, and much abdominal pain and tenderness. Inspection of the chest was sufficient to show that the heart was

very much increased in size; its action was perceptible from the third rib; a very distinct thrill was felt on placing the fingers below the second rib. A loud roaring bruit (*du diable*), like the roaring in a shell close to the ear, was heard over a space from the sternum to the external border of the chest. These sounds were also heard to a considerable distance beyond the sternum, to the right side; but they were most distinct at the space first mentioned. A double mitral bruit was heard at the apex. The urine was not albuminous. The condition of the patient was evidently one of much danger; but notwithstanding this, she soon recovered, and went out in a month very much relieved.

She was treated at first with opium, and afterwards with hyoscyamus and belladonna. Under this judicious treatment, and complete rest, the pulse became quiet. On the 16th of February, four days after admission, it was reduced to 120 per minute; and on the 17th still farther to 88. The sphygmograph was applied, and a rapid but regular tracing was obtained. The up-stroke corresponding with the systole was at first very short, but subsequently increased considerably.

In this case the actual damage to the heart was not verified by examination; but the case so closely resembles in symptoms and physical signs those of the two first cases, that I think the same condition of things would have been found.

A few more cases of the same kind have come under my notice, making a total of seven. Of the whole number, three made a good recovery, the constitutional disturbances passing away, although the heart remained permanently injured. Still the organ was able to do its work in such a manner, that the patient considered that health was restored.

As regards treatment, perfect rest is the most important remedial agent; and if I may draw conclusions from the very small number of cases which recovered, it has seemed to me that those narcotics which quiet the action of heart, and tend to reduce the number of pulsations—namely, conium, henbane, and belladonna—are more useful than digitalis, which seemed to me to be of little service.

REGINALD THOMPSON, M.D.

IX. LABIO-GLOSSO-LARYNGEAL PARALYSIS.

THIS form of paralysis is comparatively so rare, and its pathology has been so imperfectly studied, that for these reasons alone the following cases are deserving of record. They possess, however, additional interest from the fact that they differ in some important particulars from those described by Trousseau, and those related by Dr. Wilks in the last volume of the *Guy's Hospital Reports*. Trousseau, who first recognised this kind of paralysis as a distinct form, appears to have met with only four instances of it, and confessed that its ætiology was altogether obscure. He was able to trace the disease back no farther than to an hyperæmic condition of the upper portion of the spinal cord, the medulla, and the roots of the nerves affected, giving rise to an excessive formation of connective tissue and atrophy of the nerve-roots. He describes it, moreover, as invariably fatal. In the cases given by Dr. Wilks, there is no history of any antecedent upon which the lesion of nerve centres and roots might depend; the causes which gave rise to the atrophy are not discussed. Of the five cases described in detail, the conclusion of one only is given, and that was fatal. In four other instances incidentally alluded to, it is stated that death took place in three; and in the remaining one the event is not recorded. The two examples of this affection which have come under my own observation during the last three years tend to show that the local injury of the medulla oblongata and the nerve-roots associated with it may sometimes be traced beyond the previous hyperæmia to preëxisting, definite, and well-known morbid conditions.

With diseases, as with the different forms of the animal and vegetable world, as our knowledge increases, we dis-

cover that what we have taken to be distinct genera are but species, and what we have regarded as species are mere varieties after all. As pathology develops, it is continually found that certain groups of symptoms, and well-marked local lesions, which had come to be regarded as distinct idiopathic affections, are in reality but off-sets of other preëxisting and parent diseases from which they spring. Morbid changes which we had looked upon as primary—as produced directly by external causes—we eventually find to be only one of the later terms of a long series of such changes. These generalisations are being constantly extended; and nothing is more probable than that this curious lesion of the medulla and its nerve-roots will eventually turn out to be secondary in the majority of instances; will prove to have been set up by definite antecedent disease—and that not necessarily the same in every instance. In some cases, no doubt, the local lesion may be primary, and referable to no previous fault discoverable in the organism; effected by the immediate agency of causes external to it, just, for instance, as myelitis may be set up by exposure to cold and wet.

In the examples here given, however, the fact that in one the paralysis was associated with chronic Bright's disease, and that in the other there was a history strongly suggestive of syphilis, combined with the known tendency of these diseases to originate morbid changes in the nerve-centres, justifies the presumption that in these instances the local lesion was secondary—a sequence of the Bright's disease and syphilis respectively.

The complete recovery which took place in one case shows that the local injury is not invariably of an irreparable nature, as Trousseau's experience had led him to believe. So favourable an event is, however, as far as I know, entirely exceptional, and to be explained no doubt by the special constitutional disease of which it was the fruit.

The particular nerves which were affected in the following cases, and the degree in which each was implicated, show some variation from the conditions observed

by Trousseau and Dr. Wilks. They were all members, however, of that special group which have been proved by the elaborate researches of Mr. Lockhart Clarke to be so intimately associated at their origin in a limited tract of the medulla, viz. the fifth, seventh, eighth, and ninth, and which in combination preside over deglutition and articulate speech. The symptoms observed in labio-glossolaryngeal paralysis, and the lesions found after death, exhibit on the whole a most remarkable uniformity; but the number of important nerves connected with the seat of disease would lead us to expect variations within certain limits, such as were found in the examples here related.

CASE I. Sarah M., a small thin woman, æt. 55, was brought to St. Mary's Hospital as an out-patient, by her daughter, on September 2d, 1868. She had completely lost her speech, and could only utter inarticulate unintelligible sounds. From her daughter, and subsequently from herself when she had recovered speech sufficiently to give an account of the seizure, the following history was obtained. Five days previously she got up as usual, at six o'clock in the morning, to call her son to go to his work. At this time her speech was unaffected; she felt quite well, and had had a good night's rest. She returned to bed and slept till seven, then rose again to light the fire. She failed in this, however, the matches going out; and therefore went to a girl who lived in the house to get a light. When she attempted to ask her for one, she found that she was unable to speak. Although she was then able to complete the lighting of the fire, and could walk perfectly well, she found the same day that she could not work her mangle, and could not rub or wring clothes properly when washing; so that she was obliged to get some one to assist her for a week after the attack. She felt no confusion of mind, no giddiness or pain in the head when first seized; but her friends remarked that she looked very wild and odd. About twelve months previous to this she had a similar attack; speech, however, being only impaired, not wholly lost. She was engaged in sitting up with a sick person, but fell soundly asleep. Roused suddenly by the patient calling loudly to her, she woke up confused and frightened; and in speaking to her son shortly after, she found that she could not articulate distinctly. He observed this, and accused her of being drunk. There was no affection of the arm and leg, no headache or giddiness. Speech was gradually recovered in the course of a few weeks.

Owing to my absence from town when the patient first came to the Hospital, full notes of the case were not taken until some time afterwards. It was recorded, however, at the time of her first application, that she was unable to articulate a word, and could only utter unmeaning sounds; that she could not protrude the tongue; and that the attempt to swallow either solids or liquids brought on choking cough,

causing them to be rejected through the mouth and nose. A fortnight later, her speech had so far improved that she was able to render herself intelligible; and it was clear that she was not suffering from aphasia proper—a forgetfulness of words, or inability to connect words with ideas—but simply from want of power to elaborate the varied sounds required.

On December 16th a careful examination was made of her condition. Her appearance, and the expression of her countenance, were very striking and characteristic. Owing to paralysis of the muscles of the lower half of the face, the lips and cheeks hung down loose and flaccid, the upper lip a limp, flat, pendulous curtain; the lower outfallen by its own weight, and half everted; so that a space was left displaying the teeth between the two, and the saliva dribbled out at the angles of the mouth. A deep furrow ran across each cheek diagonally from the root of the nose to the angle of the mouth, caused by the hanging of the skin in a loose atonic fold there. The skin of the forehead was gathered up into horizontal wrinkles by the constant contraction of the occipito-frontalis; while at the same time that between the eyebrows was drawn together in perpendicular furrows by the contraction of the corrugator supercilii, giving an odd expression to the face—a combination of surprise with frowning. It seemed as if the action of these muscles of the upper part of the face was invoked to obviate to some extent the falling of the lips and cheeks consequent upon the paralysis of the levators and buccinators. The peculiar expression of countenance, and the individual changes in the condition of the facial muscles which gave rise to it, are very well shown in the accompanying woodcut.



Labio-glosso-laryngeal paralysis. (From a photograph.)

The orbicularis palpebrarum contracted perfectly, but she had a difficulty in closing each eye separately. The orbicularis oris was paralysed, so that she was unable to whistle or to spit, the lips remaining

almost motionless and flaccid in spite of all her efforts. On attempting to laugh, the only result which followed was, that the corners of the mouth were drawn slightly outwards—the right a little downwards, the left a little upwards. The buccinators appeared to be only imperfectly paralysed, food lodging occasionally behind the teeth, and requiring the assistance of the fingers to dislodge it. The masseters and temporals acted perfectly. On the whole, therefore, it appeared that all the muscles supplied by the facial nerve below the orbit were paralysed; while those above the orbit supplied by the same nerve, and the deep muscles supplied by the fifth nerve, were unaffected. Taking next the tongue, it was found it could be but very partially protruded—the tip only being slowly extended beyond the line of the teeth; the patient stating that it felt as if tied at the back. It could be moved from side to side only very slowly, and with evident difficulty. There was no atrophy, and common sensation appeared to be little, if at all, impaired. The patient asserted that the sense of taste had been affected from the first; that vinegar, which she was in the habit of taking, tasted like water; oranges like salt-and-water. On placing some quinine on the tip of the tongue, she was unable to decide whether it was sweet or bitter, or indeed to perceive any taste whatever; but on its being placed at the base, she discovered after a few seconds that it was bitter. All solid food, as she expressed it, tasted like sawdust. It was clear, then, from the loss of motor power in the tongue, that the hypoglossal was seriously affected; while the loss of taste in the anterior half of the tongue showed the gustatory branch of the fifth to be implicated: the motor filaments supplied to the deep muscles of mastication, and those of common sensation to the face, were unaffected. The dull sense of taste remaining at the base of the tongue, and the persistence of common sensation there, proved that the glosso-pharyngeal was but partially involved. Examining next the throat, the soft palate and uvula were seen hanging loosely down, the left pillar of the fauces seeming shorter than the right, as if the base of the uvula was dragged downwards from the centre towards the right. In the velum, fauces, pharynx, and the superior aspect of the larynx, sensation was decidedly imperfect, although not destroyed, the excitator function being in almost entire abeyance; for on tickling the velum there was no response to the stimulus—the touch could be felt, but inaccurately. No nausea, no attempt at deglutition followed. The impaired sensibility and the loss of motor power in these parts was strikingly shown on introducing the finger into the throat. The pharynx contracted very slightly, the larynx did not rise for the act of deglutition, nor was any feeling of nausea produced. The finger could be moved freely about in all directions, passed over the epiglottis, and the whole cavity of the pharynx explored, without causing any reflex action beyond faint contraction of the pharyngeal muscles. The patient stated that she felt no sensation of nausea, but that the finger felt rough and choked her—the same sensation as food gave her sometimes. Her eyes filled with tears after a time, but there was no retching or straining. So little inconvenience did this exploration by the finger cause the patient, that she was quite indifferent to any number of examinations; and was made

use of to demonstrate the relation of parts in this region to the students, and for the purpose of laryngoscopic observations, with peculiar advantage. The result of these paralyses was shown in the difficulty of swallowing, the choking and cough caused by the attempt, and the rejection of food by the mouth and nostrils. It seemed as if there was certainly some impairment of the excitor nerves; for although the non-elevation of the larynx on stimulation of the fauces, and the consequent entry of food into the glottis in swallowing, would be accounted for by the paralysis of the hypoglossal—the chief motor nerve of the hyoid muscles—already shown to exist by the condition of the tongue; and by the paralysis of the lower portion of facial, the motor nerve of the stylo-hyoid and digastric muscles, also previously ascertained: yet this would not explain why there was no sensation of nausea, or why the reflex act of vomiting was not excited. If the excitor impression had been conveyed to the centre, the sense of nausea would have been set up; and, the motor nerves called into play by the act of retching being intact, an attempt at vomiting would necessarily have followed. As, however, the glosso-pharyngeal had not wholly lost its function, though somewhat impaired, the deficiency in excitor power must have been principally dependent upon the paralysis of the branches of the fifth nerve supplying the soft palate, uvula, and fauces. The affection of the gustatory branch renders this very probable; the quiescence of the larynx under titillation seems to imply affection of the sensory superior laryngeal; but beyond this, there was nothing to show that the pneumo-gastrics or spinal accessory were in any degree involved. The fall of the velum, permitting the entry of food into the posterior nares, was no doubt due to paralysis of the motor filaments, distributed to the muscles of the palate and uvula from the otic and Meckel's ganglion, and derived primarily from the facial nerve.

The effects of the paralyses above detailed upon the voice and articulation were those so graphically described by Trousseau in his account of this disease. The voice had a nasal twang, like that of a person with deficient palate, resulting from the imperfect closure of the posterior nares by the velum and uvula. Those sounds which were executed by the larynx alone were pronounced with ease; while, on the other hand, those which required the action of the tongue and lips were uttered very imperfectly and with great difficulty. Thus *a* and *e*, laryngeal sounds, were readily uttered; but *o* and *u*, which require the aid of the lips, incompletely and feebly. The labials, and indeed all the consonants, were hardly recognisable in her pronunciation; *x* and *y* seemed to offer the greatest difficulty: the former she turned into something like 'eggs,' the latter into 'goo,' both sounds being very ill-defined. The voice did not appear to be weakened. Respiration was free and good. Although there had been some temporary weakness of the right arm, this had passed off; and her walking powers were so good, that she came to the Hospital, a distance of a mile and a half, and back again, on foot, without fatigue, walking briskly and easily. The urine was found to contain a considerable quantity of albumen, and under the microscope showed numerous granular casts.

She was treated with tonics and iodide of potassium for three

months, during which time she exhibited considerable improvement in general health, and in the power of speech and deglutition. After a time she became troubled with incontinence of urine, which constantly dribbled away; but this ceased completely on the administration of fifteen-minim doses of tincture of cantharides. She continued with little further change until July, when her daughter brought her to me completely speechless: she was fully intelligent, and answered by signs the various questions put to her. She indicated in this way that the left arm and leg were numb and weak; but the grasp of that hand seemed as strong as the other, and she walked without limp or difficulty. She was quite unable to protrude the tongue beyond the teeth. Her daughter told me, that she had been getting worse for some little time, but the total loss of speech and slight hemiplegia had apparently come on suddenly. She also said, that any attempt to swallow liquid or solid food caused choking cough, and the food was rejected. I procured her admission as an in-patient, and she remained several weeks under Dr. Sieveking's care. Under iodide of potassium, rest, and nutritious food, she greatly improved, and was discharged able to swallow with very little difficulty, and to articulate, imperfectly indeed, but so as to be understood. The urine continued albuminous, and of low specific gravity throughout. After her discharge from the wards she resumed her attendance as an out-patient; and she remained in very much the same state until October, when the difficulty of articulation increased again, and that of swallowing to a dangerous extent. She became much more feeble, and there was some slight œdema of the legs. I therefore gave her another letter of admission as in-patient. In consequence, however, of the medical wards being over full at the time she was not admitted; a fact which I unfortunately did not ascertain until some weeks afterwards. On inquiry at her home, I discovered that soon after her application for admission into the Hospital she had entered the Kensington workhouse, and had died there ten days afterwards. I was able to learn no particulars regarding her last illness, except that the body was not examined after death.

In this case the spinal accessory nerve appeared to be very slightly, if at all, affected. The laryngeal sounds were produced without difficulty; and the act of coughing was effected, and mucus expelled from the air-passages, without appreciable hindrance. In all the records of previous cases which I have had the opportunity of examining, the functions of this nerve were seriously impaired; and in fatal cases, where a post-mortem examination has been made, its roots have been found extensively atrophied. The absence of any perceptible feebleness or eccentricity of respiration shows that this and the pneumogastric performed their office with tolerable efficiency. On the other hand, total loss of taste in the forepart of

the tongue shows that the gustatory branch of the fifth was seriously implicated. The dulness of the same special sense at the root of the tongue proves the glosso-pharyngeal to have been in some degree, although less extensively, affected. The impairment of common sensation in the base of the tongue, the soft palate, fauces, and pharynx, affords additional evidence that the fifth nerve and the glosso-pharyngeal were partially involved, together with the majority of the medullary group. In this respect, also, this case differs from those recorded by other observers, in all of which these nerves appear to have remained intact.

CASE II. Elizabeth C., a married woman, æt. 42, became an out-patient at St. Mary's Hospital in November 1867. Her speech was so much affected, that it was difficult to make out a word of what she attempted to say; but from the statement of a fellow-servant who accompanied her, and her own additions and corrections afterwards, the following history was elicited: For some months she had suffered from frequent attacks of violent shooting pain in the head, accompanied by dimness of vision, and quite unlike any headache she ever felt before. With this exception, she remained in good health until a few days before she came to me, when she was suddenly seized, while sitting in a chair in the daytime, with total loss of speech, and paralysis of the right side. Her face was drawn, the right arm and leg utterly useless, and she found herself only able to utter inarticulate sounds; there was no loss of consciousness, or it was so transitory as to escape observation. The use of the leg was fully regained in about a week; but the arm remained weak for a considerable time. For two days speech was so far lost, that she could only utter unintelligible sounds, a repetition of something like 'hubble, bubble, bubble, bubble.' It was quite clear from the account, that the loss of speech consisted in loss of power to articulate, and not from any forgetfulness of words, or inability to connect the idea with the words expressing it; she knew the words, and tried to say them, but could not.

When first fully examined, several weeks after the attack, the paralysis of the limbs had almost disappeared; she could walk perfectly well; but the right arm was still weaker than the left, and sensation slightly impaired. She found that she was very liable to drop things when carrying them in that hand. Her speech was thick, indistinct, and nasal, and she was unable to protrude the tongue fully. The condition of the lingual, palatal, and facial nerves was, however, not accurately ascertained; the pupils were of equal size, and contracted normally. She complained of severe shooting pain in the head, and of extreme drowsiness. The catamenia had been irregular for the last two years. She had had four still-born children; her first child, however, was born alive, and although delicate had survived. It had never had

snuffles, or any eruption; but she herself had an eruption, which she said was like small-pox, shortly after her first confinement. There was no positive history of syphilis. The urine was free from any trace of albumen, and of normal sp. gr. Small doses of iodide of potassium were ordered, which she continued to take for several weeks. No improvement followed; articulation remained extremely indistinct; and drowsiness increased so much, that she fell asleep constantly when sitting down, and even nodded when she was standing or walking. Small doses of biniodide of mercury (3ss. of liq. hydrarg. perchlor. with gr. v. of iodide of potassium) were substituted for the iodide of potassium; but four days later she was decidedly worse: her hands were tremulous, she had become forgetful and low-spirited; she had completely lost the power of speech on one occasion for several minutes, and it was now more indistinct than it had yet been. The treatment was continued. When she came to the Hospital a week afterwards, articulation was still more imperfect; she spoke as one very drunk, and was quite unintelligible. Her companion stated, that two days previously she had entered the kitchen looking very strange and trembling violently. In reply to questions, she uttered meaningless sounds; but evidently clearly understood what was said to her. This so far improved, that she was able to articulate words, but very imperfectly. From this time she experienced great difficulty in swallowing, 'the food sticking in the roof of her mouth.' Solids were more easily swallowed than liquids; the latter causing great coughing, and being rejected partly through the nose. Since this attack she had suffered much from vertigo, and the numbness and weakness of the right arm had become more marked. She complained also of her food being tasteless, and of an increased flow of saliva. She was at once admitted as an in-patient, under the care of Dr. Sieveking. At first there was little change in her condition; but in the course of ten days decided improvement in speech and in the power of swallowing followed a succession of small blisters to the nape of the neck, no medicine being given. Iodide of potassium was then given in three-grain doses three times a day; and she regained the power of articulation and of swallowing so satisfactorily, that she was discharged a fortnight afterwards. She was then able to swallow both fluids and solids without any choking, and the only affection of speech a slow and laboured articulation. A year afterwards I met her accidentally in the street, and she informed me that she had had no return of her illness, and had completely regained her health. She spoke with perfect fluency and clear-articulation.

Although in this case no examination was made into the precise affection of the nerves of the tongue, soft palate, and larynx, the seat of injury was obvious. The choking and cough caused by food showed that the rima glottis was not properly closed by the elevation of the larynx during the act of deglutition; and this, combined with the difficulty of articulation, and the inability to put

out the tongue fully, were sufficient proof of the paralysis of the hypo-glossal, the motor nerve of the hyoid muscles and the tongue. It is possible, too, that filaments to the stylo-hyoid and digastric muscles supplied from the facial nerve were also implicated. Singularly enough, however, I find no note of the condition of the facial muscles. It is probable that the paralysis there was not complete enough to cause any notable change in the countenance, and that it was overlooked; for I know no instance in which the lower branches of the facial nerve were not in some degree involved. The entry of food into the posterior nares showed paralysis of the velum palati, causing the aperture to remain unclosed during the act of deglutition. This again implied affection of the facial, from which the motor filaments supplied to these parts from the otic and Meckel's ganglion are probably derived. It is possible, however, that the defective action of the palatal and pharyngeal muscles might be due to the arrest of the excitator influence of the glosso-pharyngeal and the filaments of the fifth nerve supplied to the soft palate and pharynx; the reflex act of deglutition being imperfectly performed, in consequence of the stimulus to the motor nerves being feebly conveyed by the defective sensory nerves. The alleged partial loss of taste, which might depend upon lesion of either or both of these nerves, lends colour to this view. As a rule, however, the glosso-pharyngeal preserves a singular immunity in this form of paralysis. It is probable that in this instance, as in the preceding, both the sensory and motor nerves of the pharynx, palate, and tongue were implicated in the disease. The history of the patient having had four still-born children, and the general eruption after her first confinement, are highly suggestive of syphilis. Direct history or proof of the existence of this specific taint there was none. The violent pain in the head, long-continued and peculiar in its character, is also a symptom which points to syphilis as the cause. The most extreme and obstinate pain in the head I ever met with was in the case of a man who had passed through all the regular stages of the syphilitic series; and such pain is, I think, very characteristic of

syphilitic cerebral affection. The fact, too, that recovery took place in the present case under long-continued treatment by iodide of potassium, and, indeed, that the patient recovered at all, is strongly in favour of the syphilitic origin of the disease. Whether syphilis was at the root of the evil or not, the history of a case of labio-glossolaryngeal paralysis which eventually got well, imperfect as the details are, cannot be devoid of interest.

W. B. CHEADLE, M.D.

X. ON THE ETIOLOGY OF PNEUMONIA.

THE general influence of weather upon the so-called inflammatory diseases of the chest is matter of common observation. Low temperature, easterly winds, sudden changes of whatever kind, are believed to increase the whole group of chest affections alike. I propose to consider very shortly how far this popular view is the correct one; for it seems not unreasonable to expect that diseases so different in their history and progress as pneumonia and bronchitis should in their origin be influenced in different degrees by the same set of circumstances.

Such an inquiry, to be complete, must review the weather conditions, both in this country and abroad, at several periods; at times when the diseases in question are unusually prevalent, and at times when they are unusually rare. Along with this, the geographical distribution of the two must be considered, and the records of past epidemics. Should any conclusion be arrived at by these means, it would still have to stand the test of our daily experience.

Even were the materials at hand for such an investigation, it would obviously be open to many sources of error. We have, for instance, to trust to reports of very unequal value. For our own country we have no fuller information than that furnished by the Registrar-General's Reports, and for other countries we have hardly any information at all. Again, though we desire to deal only with the simple forms of the two diseases, there are no means, in such figures as we get, of separating these from the others. It does not even follow that the prevalence of a disease is always correctly measured by the number

*It never
can be.*

of deaths it occasions. There is the farther difficulty of estimating the period which should intervene between the weather, which is the assumed cause, and the death, which is the ultimate result. The mortality from pneumonia or from bronchitis suddenly rises; where precisely are we to look for the circumstances of weather to which that increase is due? In our ever-varying climate it must always be hard to determine this point, or even to say whether it is the weather of some particular period, or the mere fact of change of weather, which produces the result. These and numerous other sources of fallacy tend to disappear in a multiplication of instances. It is at least worth trying whether (regarding the Registrar's tables as true *comparatively*, and not at all for absolute numbers) it may be possible, by a series of observations upon the meteorological phenomena which in every case attend periods of high and of low mortality from pneumonia, to arrive at some general conclusions as to the influence of weather; conclusions which must either stand or fall according to what we learn of the distribution of the disease throughout the globe, of the circumstances attending its epidemics, and of such histories of individual cases as our own experience may furnish.

Accepting, then, the information of the Registrar-General's Weekly Returns, it will be observed, in the first place, that under the influence of weather (and especially of cold) the whole number of acute chest affections are at least similarly affected; their death rates rise and fall together. The only question is, whether, so far as this evidence goes, any particular condition of weather affects them unequally; so that, for instance, we may say that cold is especially prejudicial to one disease, easterly winds to another, and so on. In the case of pneumonia, the fact that there is a close correspondence between its fluctuations and those of bronchitis adds, no doubt, to the difficulty of determining the precise conditions whose influence is unequal in the two cases. At the same time, if these affections rise and fall simultaneously, we may safely conclude that the causes on which these variations depend do the same; that, so far as these arise from weather, they are

to be looked for at one and the same time for both diseases. The objection, therefore, that to compare the death rate of bronchitis with that of pneumonia is to compare diseases differing in duration, which, if they end together must have started far apart, loses its force. In every week, no doubt, deaths occur under these two headings after very different periods of illness, and from causes quite remote from climate; yet on the whole, for purposes of comparison, we may assume that the fluctuations in the rates from week to week express truly the effects of the same period of weather in both cases.

Now it appears that the lowest mortality of both pneumonia and bronchitis falls in the latter part of summer, and the highest of both during the winter. The proportion of deaths, however, for the two diseases is not constant throughout the year. During the five or six temperate months, say from May to October, this proportion approaches nearest to 1, it being not unusual at mid-summer for the mortality from pneumonia even to exceed that from bronchitis. But about the latter end of October or thereabouts, sooner or later according to temperature, the bronchitis rate rises in a greater degree than the pneumonia rate, and the maximum of difference for the two is obtained about January or February. It will be found, moreover, that while the minimum of deaths for both occurs at or about the same time, namely, in August and September, the maximum of deaths is earlier in the case of pneumonia than in bronchitis. Thus, taking the average of ten years, 1857-66, the highest number for bronchitis occurs in the middle of January, while for pneumonia it is nearly two months earlier, that is at the end of November.* We have, therefore, these two diseases presented to us as of unequal range, that of bronchitis being the larger. In summer the causes provocative

* In Paris, according to Grisolle's observations, September yields the smallest, and April the largest number of cases of pneumonia. Taking the numbers for Paris and London, with a view to compare the rates from bronchitis and pneumonia respectively, we find often a striking difference in the proportions, thus:

London, week ending March 12, 1870, bronchitis, 805; pneumonia, 100.

Paris, week ending March 5, 1870, bronchitis, 100; pneumonia, 131.

of both are at their weakest; as winter approaches these are more felt, and pneumonia is apt to suffer to its utmost earlier than bronchitis.

Admitting, as all must do, that these changes are dependent in a great degree upon the changing seasons, it must be admitted too that the prevalence of other diseases, or of that general influence hostile to health which exists during epidemics, would tend from time to time to disturb the results arrived at by the mere comparison of one season with another. With communities, as with individuals, there are times, we know, when the system responds with exceptional readiness to influences which at other periods would be unfelt. In all the variations, therefore, of the death rate from bronchitis or pneumonia throughout the year, it is necessary to keep continually in view not only the same variations in other diseases, but also the general tone of the public health. It seems probable, for instance, that the prevalence of diarrhoea during certain summers would affect the death rate from other diseases than diarrhoea itself; that, for children at least, there must be found somewhere in the tables a place for those not dying from diarrhoea, but from the secondary affections springing out of it—from bronchitis and pneumonia, amongst the rest. Still more should we expect to find that the fatality during cholera times was not wholly from cholera, or even from the sequel of cholera, but from some condition or other of the atmosphere or what not, evidenced to us chiefly by that particular epidemic. However this may be, it does not appear from the tables that a high rate of mortality from diarrhoea is apt to concur with a high rate from bronchitis or pneumonia. In July 1865, when diarrhoea was more fatal than in the same month of many previous years, the mortality from the diseases in question was below the average. It appears, however, that during the cholera epidemic of 1849, and, less conspicuously, in that of 1854, there was a marked increase of mortality from pneumonia as compared with bronchitis. For the rest, we can say no more than that weeks of high mortality from typhus and 'infantile fever' are as a rule high for these diseases also; so that it

is necessary in every week to review the whole column of figures before attributing such increased mortality to a direct weather influence.

To these considerations it must be added that in affections so allied as bronchitis and pneumonia—mistaken often the one for the other, or the name of either used indifferently to describe conditions for which there is no fit column in the returns—an increase in the one rate from whatever cause must always tend to drag up the other. However unequal, therefore, the real influence of the several agencies now to be considered upon the two diseases respectively, the apparent inequality, judged of by the light of these tables, will always be less than the actual inequality.

As regards the influence of temperature, it would seem that cold does not necessarily affect the pneumonia rate, but always and markedly the bronchitis rate. Take for instance the early winter of 1859: a low temperature towards the end of October and again in the middle of November is followed by a bronchitis rate greatly in excess of the average. Pneumonia on the other hand, though not unaffected by the change, is only slightly so, and remains to the end of the month much under its average; when with excessive cold and a north wind it rises considerably. Again, extreme cold in the middle of January 1867 is followed by a large increase in the rate of bronchitis, which for the week ending on the 26th rises to 162 over its average; while pneumonia actually decreases at the same time, and to the end of the month remains below its ten years' average; the direction of wind being north-west and south-west.

A glance at the tables will show how surely the rate of bronchitis is affected by cold. They show, no doubt, a similar tendency on the part of pneumonia; but, as has been shown, this is not invariable nor strongly marked. There seems, indeed, no assignable limit to the rise of bronchitis with lowered temperature. With the extreme cold of January 1864 its rate (for the week ending January 16th) is perhaps the highest on record; pneumonia, on the other hand, many times during the same year is

higher than for this particular week.* It has been said already that pneumonia obtains its maximum in November. If cold were the chief agent in its production, it would, like bronchitis, be most frequent in January. This conclusion as to the effect of cold receives support from what we know of the geographical distribution of pneumonia. It is a disease especially of temperate regions. At the poles and in the tropics it is very rare. It has been computed that the proportion of pneumonia to other diseases at Chamounix is as much as 1 in 5, while on the African coast it is as little as 1 in 6 or 7. It is very rare in the Presidency of Madras; equally so amongst those exposed to the extremest cold in expeditions to the Arctic regions.

Does rain influence the rate of mortality from bronchitis or pneumonia? I have no sufficient data upon the subject, but such as I have yield a very uniform result. Take again the year 1859. In the weeks following periods of abundant rain it happens always that the disproportion in the mortalities of the two diseases is conspicuous. Thus in the week ending July 2d, 1.24 inches of rain fell; for the following week bronchitis is above and pneumonia below its average. In the week ending 23d of July there were 2.15 inches of rain. For the subsequent week the mortality from bronchitis is the highest, and that from pneumonia is the lowest of the whole ten years of corresponding weeks quoted. There is, in fact—it so happens—only one week in this year where a great fall of rain is not followed by a similar altered proportion, and on this occasion nearly all the rain fell on one day, a steady downpour of nine hours. Take 1867. Here again it will be found, that after weeks of unusual rain bronchitis is high out of proportion with pneumonia. Other years might be quoted to the same effect. There are of course

* It may be urged with truth, that the general effect of extreme cold in carrying off old people is here to be taken into account, since these, although dying with some form or other of bronchorrhœa, are not in fact killed by bronchitis in all the cases where that cause of death is assigned. But even omitting these, or a large proportion of them, the above remarks are still true. It is the children, however, who contribute chiefly to swell the rate when cold is severe, and these may fairly be claimed as the proper victims of the disease.

numerous circumstances to be considered before asserting that wet weather has any direct influence of this kind; but I think no more than the truth is expressed by saying, that any considerable amount of wet has a tendency to heighten the bronchitis rate, but has no such tendency as regards the pneumonia rate; the very lowest numbers of this latter out of ten years being found to follow weeks of excessive rain (Pages 198 and 321, vol. xxviii. *Weekly Returns*).

As bearing upon this question, we find that in marshy localities, where intermittents are prevalent, pneumonia is little felt, although bronchial catarrh is often common in such places. We know too that during the rains of the monsoon in India pneumonia shows a remarkable decrease. According to an analysis by Dr. Morehead of 313 cases admitted into hospital, it appears that the three months of greatest rain—July, August, September—are the three also for which there is a remarkable decline in admissions from this cause. The numbers are the smallest of the whole year, and July, the very rainiest month, shows only nine such admissions, the next smallest number falling in August, and being just double of this. Dr. Morehead,* comparing his figures with those of M. Grisolle, observes that for these months there is a smaller decline for Bombay than for Paris; he argues thence that a moist atmosphere and high winds tend to produce pneumonia. The inference is surely unjust. Dr. Morehead's tables render it probable that the range of pneumonia in Paris is greater than its range in Bombay. They show at the same time that the causes productive of the disease in Bombay are at their least during these monsoon months. If, then, rain is the great feature which distinguishes this season from others, we are forbidden to attribute to it any special influence for evil.

In judging of the apparent influence of *wind*, it is not enough of course to regard only the quarter of the compass recorded by the register; we must consider the force of the wind as well as its direction. At all seasons of the year there are many days when, from the air being com-

* Dr. Morehead on the *Diseases of India*, vol. ii. p. 308 et seq.

paratively at rest, we are unconscious of the fact that the wind, such as it is, is setting from the east or north-east; there is no wind properly so called. The proverbial belief of mankind which connects various ills to the body with the blowing of an east wind takes its origin from our own sensations when exposed to such blasts. It is not supposed—probably it is not true—that the same or similar effects follow when these sensations are not experienced. Calm weather or a small amount of horizontal movement of air is apt to correspond with low death rates from pneumonia, be the position of the weathercock what it will. Wind, on the other hand, it would seem, is favourable to pneumonia, chiefly, if not altogether, when its direction is northerly or easterly. It is only an illustration of this remark to find, that during the calm weather of the spring of 1859, although the direction of the wind was registered as north-east, the mortality from pneumonia was unusually low. With the wind in that same quarter and a large amount of horizontal movement (as in March of 1867 and August of 1866) the mortality greatly exceeds the average. If we say, then, that high winds from the north and north-east, combined with a low temperature, yet not necessarily very low, favour the development of pneumonia, and that bronchitis, while similarly affected by the same causes, suffers in a less degree, I think the statement will be borne out by the returns. It may probably be added, that the effects of a very low temperature and of much rain are seen in raising the bronchitis rate rather than the pneumonia rate.

It may be said that observations on several agencies taken separately are open to objection. Let us take them in combination. We may choose, for instance, a year of very high mortality so far as these diseases are concerned, and compare it with one of very low mortality, and so, by placing the weather phenomena of the two years side by side, discover the conditions on whose presence or absence the variations in the death rate apparently depend. Now it happens that the summer of 1859 was remarkable for a very low mortality from pneumonia, and the summer of 1866 for a very high mortality from the same cause. In

the former year the bronchitis rate is not affected; in the latter it is high, but not raised in an equal proportion with pneumonia. As regards the state of the general health, the total of deaths for both years exceeds the average owing to a large mortality from diarrhoea. In 1866 there was a short outbreak of cholera, which, commencing in July, was at its height at the opening of August, when 1053 deaths are registered for one week. From that time it declines considerably, but still numbers between one and two hundred dead weekly until late in the autumn. At the worst of the epidemic we have pneumonia showing a higher mortality than bronchitis, both being above the average. A similar phenomenon is observable in other cholera years, and especially in 1849.* On the other hand, in the year 1859, with a severe epidemic of diarrhoea, but with very little cholera, there is an almost unprecedented fall in pneumonia, in which bronchitis does not share.†

What are the meteorological circumstances concurring with the low and the high rate of these two years respectively? Both summers are exceptionally hot. With the low rate of 1859 the wind is chiefly southerly, less variable, and for a fewer number of days easterly and north-easterly than with the high rate of 1866. The horizontal movement of air is throughout July and August, the months referred to, much less for the healthy year. Furthermore, with the year of high mortality, the wind veers round to the south-west in the week ending September 8, and the pneumonia rate becomes less for the week following. In fact, the great disparity between the rates of the two years disappears for a while at this point, and so long as, for both years, south-west winds are blowing. In October, however, with a return to the conditions of the summer, there is again a wide difference. The healthier autumn is much the colder; south-west winds and a small horizontal movement still coincide with the low rate.

Again, place the week ending November 12, 1859, beside the week ending on the same day of 1864. I choose these two only because they exhibit the largest difference I can

* See, for instance, weeks ending August 4 and August 11 of 1849.

† See especially weeks ending July 30 and August 13, 1859.

find; for 1859 the numbers are 60, for 1864 they are 165. Bronchitis, again, does not sympathise in the case of the low rate, but it does in the case of the high. There is no severe epidemic in either year, but typhus is twice as fatal in 1864 as in 1859. Taking the weather of the latter part of October in each year, it appears once more that the healthier year is by far the colder—the temperature indeed of the week ending October 29 is only 38·6; it is unprecedently low—far lower at least than any other year shown. The effect of this low temperature is not unmarked: pneumonia rises considerably, yet for one week only, and then not so high as to reach its average; bronchitis on the contrary rises from much below to much above its average, and continues to rise during subsequent weeks. From the middle of October to the 5th November 1859 the wind is chiefly south-west. That period, therefore, contrasts remarkably with the same time in 1864, when the direction of the wind is north and north-east. There is more rain with the low pneumonia rate than with the high.

Once more, we find included in one and the same year—the year 1868—a remarkable contrast in comparing similar seasons, February showing a very low rate from pneumonia, and December a very high rate. Thus the deaths from pneumonia for the week ending February 15th are 58, and from then till the end of March the weekly numbers are just over 70. In December, on the contrary, the rates for three successive weeks are together 360 as against 207 for three weeks of February. Now the temperature during the last weeks of January and of November (the periods respectively preceding the low and the high rates) is about the same, but the beginning of February is colder than the beginning of December; still, therefore, we have cold with the healthier time. The direction of the wind from January 26th to February 15th is mostly south-west and west-south-west. It is the same during March; and during March there is again a low mortality in pneumonia. For the first half of April the wind is easterly; by the 18th of that month the mortality has risen to 98. As regards the high rate which distinguishes the latter part of the same year, we have the wind variable

from the 22d of November till the end of the month, then east and south-east till the 3d of December, when, after a few days of south-westerly winds, it again becomes variable, but chiefly south-east till the 15th. At this date it sets south-west, and continues in that quarter with hardly a break till the end of the year. And now the probability that this heightened mortality of early December is somehow connected with the direction of the wind is rendered greater by the fact, that with the change to south-west we have for the last two weeks of December—colder weeks and very rainy—a mortality of 170 against 243 for the first two weeks.

These details are tedious, and must fail to be wholly convincing. There is a difficulty in rendering them even intelligible without appending the tables to which they refer. Such as they are, the conclusions to which they point seem to be in accordance with the little that is to be learnt regarding the distribution of pneumonia. It is impossible to speak precisely upon this point; yet we know that neither extremes of temperature, nor swamp nor moisture, nor the climates which in the world are most unfriendly to human life, have any marked influence over the disease in question. It is in the regions that are called temperate and in their exposed places that pneumonia is especially prevalent. Where north and north-east winds prevail, where the configuration of the country is favourable to currents of cold air, in such places as Madrid, Genoa, Florence, Naples, Gibraltar—different in other respects, but alike in this—in the high plateaux of countries whose lowlands are strangers to the disease, as in Africa and Mexico, pneumonia finds its chief victims. Shall we be very far wrong, then, in concluding that the brisk movement of air at a moderately low temperature (which perhaps might be proximately determined in degrees) is amongst the most obvious exciting causes of simple pneumonia—cold, dry, penetrating winds from the north and north-east for pneumonia; a greater degree of cold, wet weather, variable winds, for bronchitis?*

* It is remarkable that at Gibraltar, where pneumonia prevails during the greater part of the year, the west winds of November and January concur

VOL. V. L

The frequency of pneumonia at great elevations may depend upon conditions which I do not now discuss. We are told that pneumonia and pleurisy take the first rank amongst the diseases of the most elevated towns and villages of Europe. From numerous observations M. Lombard is led to believe, that the prevalence of inflammatory maladies of the chest is in direct proportion with the elevation of the place above the sea-level. It is stated further, that the spring is their time of greatest frequency, the sickness increases as the snow melts. Moreover, epidemics of pneumonia, such as have been often observed in the mountains of Switzerland, belong more to the high valleys than the low, whilst the reverse is the case with regard to epidemic catarrh.*

But the evidence from geographical position, and the evidence from our own statistical tables—supposing both to be as complete as possible—must still be supplemented by accurate observations upon particular epidemics and individual cases. I can but refer to the circumstances of an epidemic occurring in the 22d Regiment at New Brunswick.† It was remarkable in this instance, first, that in the coldest month of the three over which the epidemic spread, the admissions into hospital from pneumonia were much fewer than for the following and warmer month; and, secondly, that that portion only of the regiment suffered which was quartered in a new building abounding in draughts. Among the women and children who were better housed, only two cases of pneumonia occurred.

But most convincing of all to my own mind are those histories of simple pneumonia—they are not common—where we have before us both the proof which post-mortem inspection affords that the disease was primary and uncombined, and along with that strong reason to believe that it was immediately excited by some weather cause.

with a greater frequency of the disease than do the east winds of other months. But then the east winds are described as bringing along with them much humidity and fog, while the west winds are cold and dry. Grisolles, *de la Pneumonie*, p. 124.

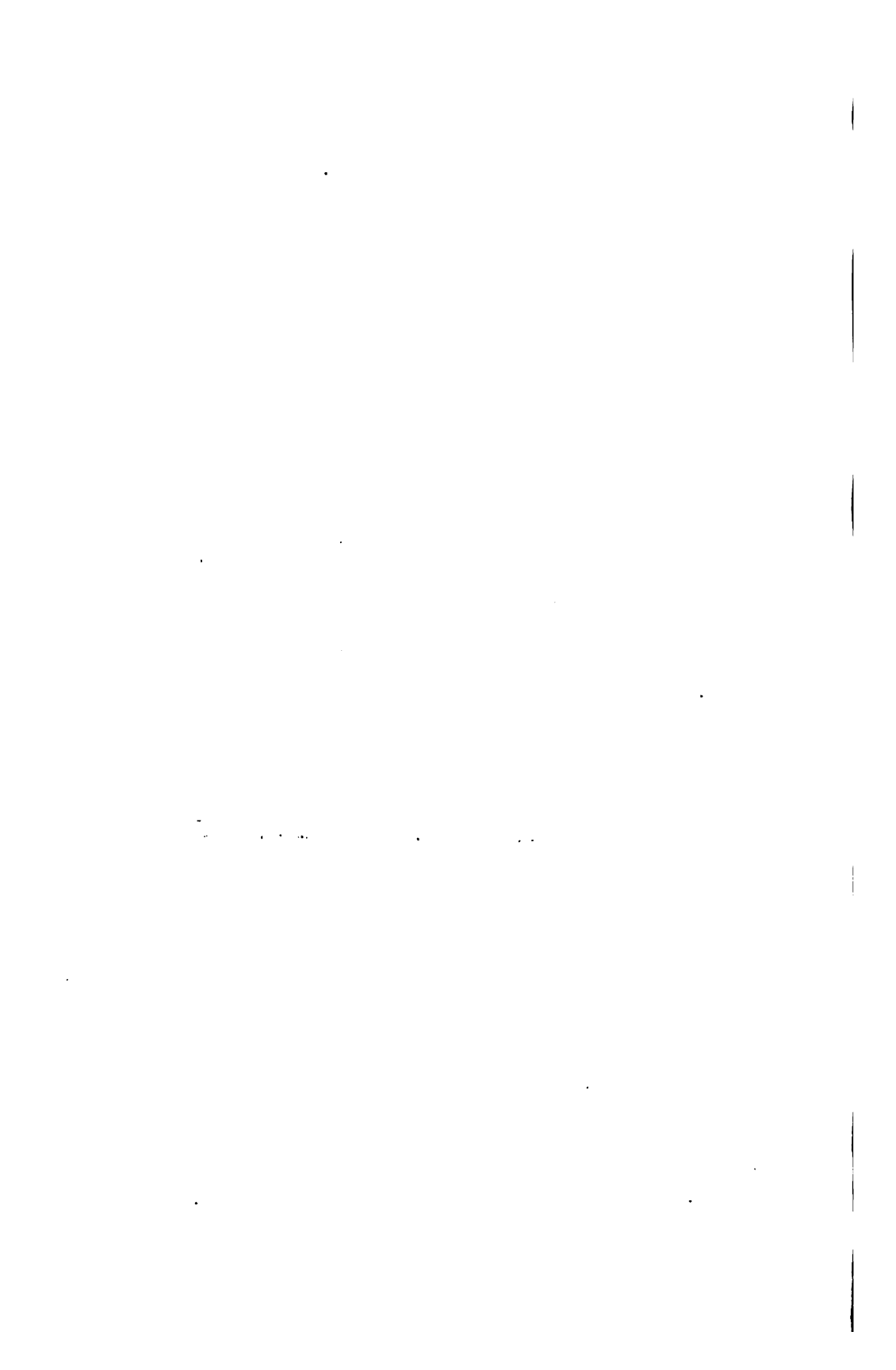
* Lombard's *Climats de Montagnes*, p. 70 et seq.

† See the admirable paper by Assist.-Surg. Welsh, *Army Medical Reports* for 1867, p. 829.

I have collected by this time a large number of such cases, where the sudden fall from health has been strikingly connected with some agency of this kind. The patient is a groom who first felt a chill when riding against the east wind, or a sailor who has been at work in the hold of a draughty ship, or a labouring man who on his way to church was seized with shivering on meeting a cold wind.

The reader may perhaps complain that I have occupied his time in an attempt to prove what no one denies, namely, that pneumonia is sometimes caused by a chill. But my object has rather been to resolve that complex cause into its factors, and to eliminate those whose influence upon pneumonia is the least. These observations, unfinished as yet and likely ever to fall far short of demonstration, refer to a small part only of a very large subject. The etiology of pneumonia must comprehend all antecedent states of the body which render it assailable from without. Neither by wounding the lung nor by noxious inhalations, nor in any other way, can we ever set up its special phenomena. Similarly, however it may seem to us that the disease is brought about by such circumstances of weather as those I have been trying to investigate, we know that it is not really so; that its root lies deeper than these, that they do but call it into life. Often indeed it is utterly beyond any reasonable conjecture to assign to simple pneumonia *any* exciting cause. A number of antecedents have an equal claim in this respect. And accordingly, in common with every other diseased state, many external things have been charged with provoking it, upon evidence even more imperfect than that which I have adduced in this paper.

OCTAVIUS STURGES, M.D.



XI. ON ANKYLOSIS.

THE term 'ankylosis' was formerly used to signify that condition of a joint in which it is bent, and more or less fixed in that position. But at the present time we consider less the position of the limb than the character of the adhesions, and whilst retaining the ancient designation, we apply the term nowadays indiscriminately to a straight or a bent condition of a joint with more or less stiffness arising from adhesions within or external to the joint. It is the character of these adhesions which constitutes the only distinction which we at present consider of importance; and thus we speak of soft adhesions, or false ankylosis, and bony adhesion, or true ankylosis.

False, fibrous, or partial ankylosis, then, is occasioned by the deposition of lymph within or around a joint, through which adhesions are formed, which interfere with motion; while true, complete, or bony ankylosis, or synostosis, is that condition in which the soft structures of the joint have been destroyed, and bony union has taken place between the adjacent bony surfaces.

False ankylosis may be *intra-capsular*; which signifies a junction through membranous bands or fibrous tissue of the contiguous surfaces of the bones which enter into the articulation; or it may be *extra-capsular*, in which case lymph is deposited external to the capsule, either in the shape of membranous bands, or there may be produced thickening of the capsule, or of a part of the capsular and ligamentary tissues around the joint.

In many instances, however, the structures both within and beyond the capsule become inflamed and thickened; lymph is poured out into the cellular tissue and about the sheaths of the tendons and muscles, and the various structures become more or less matted together, whether

in an extended or a flexed position; and lymph is also deposited upon the synovial membrane, through which adhesions form and motion is hindered. In some cases the adhesions which have formed are slender, but they may notwithstanding prevent useful motion; or again, they may be more extensive, and yet admit of treatment to restore motion. Inflammation may extend from without inwards, or the reverse may take place. Thus, of the first description we have inflammation arising from mechanical injuries, phlegmonous erysipelas, and burns; while of the latter, acute synovitis, as from over-exercise, and strumous, rheumatic, syphilitic, and gonorrhoeal inflammations, are the chief forms.

Each of these forms of inflammation presents characters peculiar to itself in the ankylosis which results; so that it may for the most part be predicated what form of inflammation gave rise to the joint-affection. It is of importance, in the treatment of ankylosis, to distinguish the various results of these different forms of inflammation—to recognise in the result the amount of force that may be necessary to overcome the rigidity of the joint; for as the sensation which is communicated to the hand in bony ankylosis is altogether different from that which is presented by fibrous ankylosis, so is there scarcely less difference between the firm fixed condition produced by gonorrhoeal rheumatism, and the soft adhesions which result from scrofulous inflammation.

The *treatment* of fibrous ankylosis may be divided into, 1st, gradual extension with or without tenotomy; and, 2d, immediate flexion of the limb with or without tenotomy, and subsequent gradual extension.

In all cases of partial ankylosis there exists some muscular rigidity; in some cases, also, cicatrices are found, resulting from loss of substance. Where adhesions are recent, contraction of a limb may probably be overcome by continued extension—such extension, namely, as is made by means of a well-adjusted instrument for the purpose; but except in cases of recent adhesions, it is generally necessary to commence the treatment by dividing the tendons of rigid muscles, and by dividing cicatrices sub-

cutaneously. It is better to proceed at once to these subcutaneous sections, rather than to prolong the treatment by extension unnecessarily; for unless the adhesions are recent, simple extension is seldom of itself and uncombined with subcutaneous section sufficient to remove the contracted condition of a limb. It is important to remember this principle of treatment; for partial displacement of the articular surfaces is easily induced by continued extension of the limb, if the tendons have not been previously divided. Indeed, it is not uncommon to see this displacement take place at the knee when extension is long continued, and where the tendons have not been divided. Whenever, therefore, it is desired to remove contraction, it is the rule first to divide the tendons of rigid muscles, and to divide cicatrices subcutaneously, and subsequently to proceed gradually to extend the limb.

But if such be the law of treatment where the articular surfaces occupy their normal positions, it is even more to be insisted on when any displacement has taken place. Extension should then without fail be preceded by the subcutaneous section of such tendons, fasciæ, and cicatrices as might interfere with the re-adjustment of the articular surfaces.

These obstacles to extension, then, having been removed, a well-adapted instrument is to be applied to the limb, and extension is to be made slowly. The instrument should support the limb efficiently; and it should always, in the first instance, be applied at that angle, whatever it may be, at which the limb was held before the subcutaneous sections were made. So soon, then, as the punctures have healed, extension may commence and be carried on gradually, without producing pain and without occasioning displacement.

I am tempted here to introduce the following case, which was written by the patient himself; and, though not truly an instance of ankylosis, it would under the old nomenclature have found its place here, and so I give it:

R. J. G., æt. 30, was admitted into St. George's Hospital, May 4th, 1870, with disease of the right knee-joint. He says: 'I had an attack of acute rheumatism about nine years ago, and since that time have

been subject to occasional rheumatic pains in various joints, especially in the right knee. About twelve months after the first attack I noticed a small swelling, about the size of a nut, of an elastic character, at the outer side of the knee. It disappeared after some four or five months, and was followed by slight effusion into the joint. This was so slight at first as to be scarcely perceptible; but with every attack of cold the tenderness and swelling increased in and around the joint. After three or four years the joint became tender to the touch at all times, and motion became more and more imperfect. I continued at my duties, and was accustomed to much walking and standing many hours daily. The joint was always more swollen and tender after the day's exercise. I consulted a surgeon, who prescribed a blister over the entire front of the knee, and cinchona with hydrarg. perchlor. internally. The medicine disagreed with the stomach, and the blister was severely felt, and it set up a good deal of inflammation around the joint. After the inflammation had subsided, the joint was not benefited. I continued to go about actively from that time, still being subject to rheumatic pains; and the knee gradually became more swollen, motion more limited, and the tenderness increased. I was in the habit of taking anti-rheumatic medicines, and applying counter-irritants—tincture of iodine, &c.—to the joint, but never gave up my duties or took a day's rest. I always felt, otherwise, in good health. In addition to my ordinary duties, about two years ago I applied myself closely to study; and at this time the knee became more swollen and flexed, and motion more limited. In July 1869, while I was walking, I suddenly felt severe pain. It was as though confined to a spot about the size of a sixpence, in the interior of the joint. This spot has, since that time, always continued painful, and has caused me when walking or standing to bring the muscles on the inner side of the thigh into unwonted action. This pain was quickly followed by a fluctuating swelling about the size of a pigeon's egg at the inner and inferior part of the thigh, immediately above the condyle of the femur. I still continued to go about, but was compelled to use two walking-sticks.

'On January 15th, 1870, I applied to Mr. Brodhurst. The joint was then greatly enlarged by effusion into and swelling all around it, and the lump above the inner side was as large as a hen's egg. I was ordered steel and cod-liver oil; to use crutches, and not to bear my weight on the leg, but to carry it in a sling. A padded metal splint was applied to the back of the joint; counter-irritation was kept up for a few months, and continuous pressure by means of bandages. The swelling and effusion diminished somewhat, but the joint was becoming much deformed by displacement of the bones of the leg outwards and backwards. On admission into the hospital there was severe and continual pain along the internal and anterior part of the head of the tibia, with increasing tension of the hamstrings; the limb was more flexed, and displacement was increasing. There was also detected considerable roughness in the interior of the joint on motion. The day after admission Mr. Brodhurst divided the semi-tendinosus tendon. This operation gave me instantaneous relief from all the severe pain around the head of the tibia. The limb was kept in splints for a few days,

until the puncture was quite healed, when it was placed in an instrument, by means of which the limb was gradually extended until it resumed its normal shape. The effused fluid became absorbed, and, after a few months, the joint diminished to its normal size. In August I had a severe attack of rheumatic fever, which weakened me very much, and retarded my recovery. There is now (Oct. 3d) good motion in the joint, and there is no roughness to be felt.'

Numberless cases, however, exist in which the means above mentioned are useless to restore to the limb either the normal position of its parts or to restore motion; cases, for instance, in which the adhesions are so firm that they do not yield to gradual extension. The pressure produced by continued extension may occasion destruction of the integument, or it may induce displacements, partial or complete, of the articular surfaces; but the adhesions, whether intra- or extra-capsular, will not yield to such force. Injury alone, but no useful result, can accrue from gradual extension in these cases. Before chloroform was introduced, these were among the *opprobria* of surgery. Then, gradual extension of such limbs was continued for months and years, without any advantage being derived.

I know an instance where an advocate of the gradual extension system and gradual extension only, continued to apply his means to a case of ankylosis of the knee for the space of fourteen years. The extending apparatus was removed by another surgeon, and the knee was excised, because bony ankylosis had taken place at an inconvenient angle. Probably if left to himself, the first operator might have continued his efforts at extension, in the firm hope of ultimate success after another period of fourteen years.

It is necessary, therefore, before proceeding to the treatment of a case of this kind, to form a correct diagnosis—to determine whether complete ankylosis has taken place, or whether the adhesions are fibrous; and if fibrous, whether they will or will not yield to gradual extension. If these several points cannot be otherwise determined, chloroform should be fully administered; so that when muscular relaxation has been obtained, both the character of the adhesions and the amount of motion may be ascertained.

When bony union has taken place, a sense of solidity and continuity of structure is communicated to the hands on grasping the limb above and below the articulation; but when fibrous adhesions have formed, either slight motion may be felt at the articulation, or at least a sense of elasticity is communicated, on endeavouring to flex the limb. And if the adhesions are of such a character, so firm and unyielding, that the normal position of the limb can only be gained by force suddenly applied to rupture the adhesions, the force should be so applied that it is used mainly, if not entirely, in flexion of the limb.

Instances of this kind are mentioned by Meckren, Bartholin, and Amussat. The latter communicated an instance to the Académie de Médecine in 1831, in which forcible flexion had been performed. But the operation may be said to have been instituted by Louvrier, whose attention had been called to cases of this description. He was successful in the first five cases which came under his care. Then he came to Paris, and not being able to distinguish between true and false ankylosis, accepted every case of the kind for operation which presented itself in the hospitals. Here he was as unsuccessful as he had been previously successful.

Palasciano, with more pathological knowledge than Louvrier, followed in his footsteps, and with more success; and having again directed attention to the operation, it was practised especially in Lyons, Berlin, and Vienna, by Bonnet, Bühring, Berend, Schuh, Lorinser, and others.

As practised at that time, and before chloroform was recognised in surgery, this was a terrible operation. Dieffenbach was among the first to modify the operation. He first divided contracted tendons subcutaneously, and then immediately ruptured the adhesions. In many instances the wounds were made to gape and extend into lacerations.

Langenbeck also saw in this operation a means of restoring power to a crippled limb; and, availing himself of the inhalation of ether, he thought it unnecessary

to divide the tendons of contracted muscles, and therefore divided the fasciæ only, and then ruptured the adhesions. But, notwithstanding the advantage which the anæsthetic agent gave him, his operations were not so successful as were those of Dieffenbach: displacements more or less complete were frequently produced.

It was only when tenotomy and anæsthesia were combined that the operation of forcible flexion could be looked upon as free from danger. I have performed 267 operations of this nature, and have never known any *contretemps* whatever—neither fracture, nor dislocation, nor pyæmia, nor inflammation.

Professor Bauer says, 'About 600 cases of affection—contraction and ankylosis—of the knee-joint have given me ample opportunity for most thorough clinical observation, and entitle me to participate in the important question which is still being discussed before the highest scientific tribunals of Europe. On the feasibility of forcible rupture of adhesions all are agreed. Its superiority over gradual extension can no more be questioned; and its former opponents have been effectually silenced by the overwhelming results which have been produced.'

Any tendons which are rigid should first be divided; and the punctures having healed, and chloroform having been fully administered, the limb to be operated on should be so firmly fixed that all motion is prevented, except that which the operator is about to impart to the limb. Thus, for instance, if the hip-joint is to be operated on, the pelvis must be fixed; if the knee, the thigh must be securely held; and so on. When the limbs are thus firmly secured, the adhesions are to be instantaneously ruptured by force applied in the direction of flexion. I say that the adhesions are instantaneously ruptured, when the patient is properly prepared, and the force is rightly adjusted. The limb is then to be bandaged; and especially the affected joint is to be firmly bandaged, and confined either in a gutta-percha splint or on a flexible splint. This bandage should on no account be removed until tenderness has ceased. The articulation should be firmly encased in the bandage; and should this become loose,

another should be placed tightly over it, and be allowed to remain so long as any tenderness continues. It is rare indeed that the bandage requires to be moistened.

I know of no danger whatever from the use of force thus applied. Indeed, when the influence of the muscles is perfectly removed, the adhesions themselves usually offer very little resistance; and if the power to be applied is sufficient for the purpose, the result is instantaneous. In a small number of instances, the hand alone is insufficient to rupture the adhesions readily; and in these I make use of an instrument to flex the limb. Not only is there no danger connected with this operation, but with moderate care it would seem to be impossible to set up unhealthy action. It is sometimes said, that in these operations fracture is not uncommon, and that inflammation is not unfrequently excited. Let it be sufficient for me to say, that I have never seen a fracture produced, nor have I known inflammation to occur, nor any other ill whatever to follow an operation of this nature; and that when disaster ensues, it is from abuse of the operation. Doubtless this operation is capable of abuse, just as is any other operation; but when it is performed as I have endeavoured to describe it, I do not know an operation more successful than this is in the whole range of surgery, nor one more free from danger.

When the joint retains its normal external form, the adhesions are easily broken down by the hand, after the limb has been properly placed in position and the full effect of chloroform has been obtained. There was lately a case under my care in the hospital, where the patient, having suffered from rheumatic inflammation, was admitted with partial ankylosis of the knee and of the ankle. The tendo Achillis was, in the first instance, divided; and after the puncture had healed, the adhesions were ruptured by flexing the foot upon the leg. On a subsequent occasion the hamstrings were divided subcutaneously; and, the punctures having healed, the adhesions at the knee-joint were ruptured by flexing the leg upon the thigh. This patient walked well when she left the hospital, and without lameness; and the movements at the

knee- and ankle-joints of the affected limb were as free as those of the sound limb.

It is a point to remember, that after dividing the tendons, and before the punctures have healed, the adhesions should not be ruptured; or they should be ruptured only with great care, lest the puncture should be extended into a rent. This extension of the puncture is much easier to effect than might be supposed; and it is, therefore, safer to allow the punctures to heal before any force is employed.

When the position of the limb is perfectly restored, then passive motion should commence. At first it may be necessary to administer chloroform, for motion is painful; but as motion increases, passive movements excite less pain.

The notes of the following cases, from my wards, of the knee and the elbow were supplied to me by Mr. Walker.

A. B., æt. 12, was admitted November 2d, 1869, into the Grosvenor Ward of St. George's Hospital. A year and a half ago he fell down and severely injured (he says dislocated) his elbow. He was brought to the hospital, and the arm was placed on an angular splint. He attended as an out-patient for two months, during which time he wore the splint.

On his admission into the hospital, it was found that ankylosis of the left elbow-joint had taken place, and that the adhesions were so firm as to prevent all motion at the joint. Chloroform was administered, and the adhesions, which were firm, were ruptured. The limb was firmly bandaged, and placed on an angular splint; and so it was left for four days. At the end of this time, as there was some tenderness still about the joint, it was kept quiet for a few days longer, when the splint was taken off, and passive motion and friction were commenced.

On the 24th of December he was made an out-patient, and in the course of six weeks had regained completely the motion of the limb; and although the power of the limb was not so great as the other arm, the extent of motion was alike in both.

September 19th, 1870. Has perfect motion in the joint, and can use the two arms alike.

J. G., æt. 22, was admitted into the Grosvenor Ward of St. George's Hospital, May 11th, 1870, for ankylosis of the left knee. Six months previously, whilst in America, he fell from a bicycle, and thus twisted his knee. He felt very little pain at the time, and did not keep his bed. Tenderness continued, however, although he paid but little attention to it. Six weeks after the accident, having returned to England, he

contracted gonorrhœa. Some days after this his knee became swollen, and so painful that he was obliged to lie still in bed. At the same time the gonorrhœa ceased. He was admitted into the hospital on December 11th, 1869, under the care of Mr. Henry Lee; and under treatment the inflammation gradually subsided; but there was left fibrous ankylosis of the joint, with immobility.

May 13th. The adhesions, which were very dense, were broken down under chloroform. The joint was firmly bandaged, and the limb was placed on a splint. Only slight pain was experienced after the operation, and that subsided entirely within half an hour of the operation; so that it was not necessary to administer an opiate.

This operation was followed by a considerable amount of motion.

June 23d. Chloroform was again administered, and other adhesions were broken down. In the course of four or five days, passive motion and friction were employed; and in September he was discharged, having gained power to bend the knee at a right angle, and to straighten the leg perfectly.

Ankylosis of the jaw takes place either in consequence of cicatrices, through injury to the mucous membrane of the cheek, or, otherwise, through inflammation of the temporo-maxillary articulation.

A cicatrix which results from destruction of the mucous membrane, even though it should not extend entirely from one alveolar border to the other, gradually and slowly contracts as cicatrization becomes complete, until the teeth are firmly fixed, one row upon the other, so that they cannot be separated; and perhaps the only motion of the jaw which remains is a slight lateral motion. This cicatrix may easily be felt by introducing the finger between the lips; and it may readily enough be divided. But this mode of treatment of cicatrices, whether of the mouth or elsewhere, seldom answers its intended purpose. Again, the cicatrix may be dissected out; but another will form, probably harder and more dense than the first. These cicatrices, which result from ulceration and sloughing of the mucous membrane of the mouth, are always preceded by such an amount of painful inflammation, that the masseter muscle becomes in a measure affected by it; and it consequently happens, that long before the cicatrix has formed to impede the separation of the jaws the child refuses to open its mouth, and keeps it more or less locked. But this painful condition of the muscle results in structural shortening; so that,

after the cicatrix has been divided, the jaws can only be separated by farther mechanical force.

Treatment.—The treatment in these cases should consist, in the first place, of subcutaneous section of the masseter muscle; and secondly, in the application of the wedge, which, being first introduced between the teeth, may be forced in by means of a screw. This is the principle of treatment which is applicable to cicatrices in general—namely, gradual extension. The treatment is slow, and demands great patience, that the teeth may not be loosened; for should this happen, it becomes impossible to extend the cicatrix. But should the cicatrix yield to gradual extension after section of the masseter, contraction will probably not again take place.

Inflammation of the temporo-maxillary articulation may occasion either partial or complete ankylosis, the plastic matter which is deposited being converted into fibrous adhesions, or bony consolidation taking place.

The treatment of these affections of the jaw is greatly complicated by the circumstance of the articulation being surrounded and acted on by very powerful muscles, and also by the circumstance that these muscles—namely, the masseters, the pterygoids, and the temporal muscles—are among the last of the voluntary muscles to yield to the influence of chloroform; so that when they become relaxed and the jaw drops, the patient will already have inhaled a very powerful dose of chloroform. It will easily be understood how this difficulty is increased when inflammation has produced thickening of tissues, with adhesions. When the adhesions are recent, they yield to the long-continued use of the wedge, and the mouth may be opened to its fullest extent. It requires, however, a very long and persevering application of the same means to prevent contraction taking place as before. With a strong will it may be done. It taxes, however, the best efforts of the patient severely. When these measures fail, nothing is left but to divide the masseter subcutaneously, and again to extend gradually with the wedges as before.

True ankylosis.—Complete, bony, or true ankylosis is rare. When it has taken place, a sensation of solidity is

communicated on grasping the limb above and below the articulation, such as can only be occasioned by continuity of bony structure. In fibrous ankylosis this sensation is never experienced. Fibrous ankylosis may, however, allow of so little motion, that with rigid muscles it may be inappreciable until chloroform has been inhaled. Therefore, as motion is thus masked, and as bony ankylosis is rare, it is safer not to express an opinion in favour of bony ankylosis until chloroform has been exhibited. When the patient is under the influence of chloroform, no doubt can exist as to the nature of the adhesions.

Bony ankylosis is the result of inflammation and supuration within the joint, together with the destruction of the articular cartilages. Ankylosis may then result between the exposed surfaces of the bones, if the inflammation be of a reparative nature, causing the deposition of new bone. When destructive inflammation ensues, causing necrosis of the epiphyses, bony union is impossible. Diseased action must cease before repair can commence; and bony union is repair. This repair, however, may be of such a character as to be useless, and even worse—it may be detrimental. Such cases then admit of treatment.

Ankylosis is occasionally observed as a congenital affection: the articular apparatus is then entirely absent. In these cases an inconvenient angle is never found, and the reparative process is as complete as nature can make it.

In bony ankylosis the articular extremities are either bound together in the course of the ligaments, or the bones are united in their entire thickness; two becoming fused into one. It has occurred to me once to see a living person without a single movable articulation: every joint was ankylosed.

Bony ankylosis is, however, rare; but union may take place at such an angle as to be in the highest degree inconvenient. Under these circumstances this repair, which is intended to be permanent and useful, may fairly be made the subject of surgical interference.

Treatment.—There are four operations which may, under certain circumstances, be done to restore motion or

to improve the position of the limb: viz. 1st, to remove a wedge of bone; 2d, to break through the ankylosis, after drilling through the new bony formation; 3d, to make a false joint; 4th, to divide the bone subcutaneously, and restore the position of the limb.

1. It was proposed by Dr. Barton of Philadelphia to remove a wedge of bone, when bony ankylosis has taken place with much deformity, so that the position of the limb might be improved; and he performed this operation on the person of a young physician, whose knee was ankylosed at a right angle. The following is his description of the operation:

‘Two incisions were made over the femur, just above the patella. The first commenced at a point opposite the upper and anterior margin of the external condyle of the femur, and, passing obliquely across the front of the thigh, terminated on the inner side. The second incision commenced also on the outer side, about two inches and a half above the first, and, passing likewise obliquely across the thigh, terminated with the other in an acute angle. By these incisions were divided the integuments, the tendon of the extensor muscles of the leg at its insertion into the upper part of the patella, and some of the contiguous fibres of the rectus and crureus muscles themselves, a greater part of the vastus internus, and a portion of the vastus externus. A flap composed, therefore, of this structure was elevated from the femur, close to the condyles. The soft parts were next detached from the outer side of the bone, from the base of the flap towards the ham, by passing the knife over the circumference of it, so as to admit of the use of a saw. The flap then being turned aside, a triangular or wedge-like piece of the femur was easily removed by means of a small narrow-bladed saw. This wedge of bone did not include the entire diameter of the femur at the point of section; so that a few lines of the posterior portion of the shaft of the bone remained yet undivided. By slightly inclining the leg backwards these yielded, and the solution was complete.’*

* *American Journal of the Medical Sciences*, vol. xxi. 1837-8.

The limb was supported on a splint at an angle corresponding to that of the knee previous to the operation; and subsequently it was brought into nearly a straight position by using a series of splints with varying angles; until at length the limb could be confined in an extended position so long as it was necessary to produce bony union.

2. Professor Brainard of Chicago proposed subcutaneous drilling and subsequent fracture as a substitute for the operation of Barton; and the operation has succeeded perfectly in his hands, and also as it was performed by Professors Gross and Pancoast at the Jefferson Medical College. The mode of operation was as follows:

'Chloroform having been administered, a longitudinal incision, hardly one half of an inch in length, was made over the outer surface of the knee, near its middle, in a line with the groove between the head of the tibia and the external condyle, down to the two bones. Through this opening a steel perforator was introduced, keeping it as nearly as possible in the direction of the line of the articulation, and passing it on to the opposite side until the point could be felt beneath the integuments. The instrument was now moved about in such a manner as to cut through and break down the osseous adhesions between the femur and the tibia on the one hand, and the femur and patella on the other. The union between the bones was exceedingly firm; but, after much difficulty, it was finally overcome, and by forcible extension of the limb, the parts yielded with a cracking noise.'

When it is desired merely to gain a better position of the limb, one or other of these operations may be performed where bony ankylosis with great deformity has taken place.

3. The third operation is that of establishing a false joint after section of the bone. This operation also was proposed and performed by Dr. Barton of Philadelphia. Dr. Barton's case was as follows:

Fracture of the femur had been followed by ankylosis at the hip-joint, and an angular union of the broken bone

* *American Journal of the Medical Sciences*, vol. 17. 1868.

had resulted; so that the thigh was flexed, and the knee was carried across the opposite thigh. Barton cut through the femur between the trochanters, and straightened the limb. The wound of the soft parts was allowed to heal, but reunion of the divided bone was prevented by subjecting it to motion from time to time—such as rotation, flexion and extension, abduction and adduction. After some few weeks the ends of the bones became smooth, rounded, and united by means of ligamentous bands; and thus an artificial joint was formed, which allowed of all the motions of the limb. This patient enjoyed the use of his artificial joint for six years; but after this time he gradually lost motion, and ankylosis took place.

This operation of Barton's was an admirable one, and the result, so far as it went, was excellent. There was this defect in it, however—that the section of the bone was made too far away from the original centre of motion.

When it is desired to reëstablish motion in an ankylosed joint, the section should be made as near as possible to the centre of the articulation, so that the power of the muscles may not be unduly diminished. And with this view I operated, in 1861, on a case somewhat similar to Dr. Barton's, where bony ankylosis was complete, but where there existed also some necrosed bone about the acetabulum. In this instance I cut through the neck of the femur subcutaneously immediately below the head of the bone, and then gouged away the remains of the head and the dead bone from the acetabulum. The wound healed almost in its entire extent by the first intention, and in three weeks it was firmly cicatrised, so that passive motion could be freely employed. In six weeks from the operation my patient began to use the limb in walking. This patient was a delicate person, and had not sufficient fortitude to continue the treatment which is necessary in these cases to retain free motion.*

In the next operation of this nature which I undertook, I removed the whole of the neck of the femur, and in consequence the fibrous connecting bands were some-

* *Proceedings of the Royal Medical and Chirurgical Society*, vol. iv.

what longer and less firm, and from the commencement motion was more free than in the former case. My patient also was in good health, and carried out with a strong will my injunctions with regard to motion. In these cases it is important to continue passive motions of the limb, otherwise shortening of the uniting medium, with more or less loss of motion, may take place.

A chronic form of inflammation may be set up in cases of this kind, whether by accident or otherwise, which may result in loss of motion, just in the same manner as it may be set up in cases of fibrous ankylosis, where motion has been perfectly restored. Thus, in a case on which I operated in 1856, in conjunction with Sir Duncan Gibb and Dr. Trouncer, motion at the hip-joint was perfectly restored, and my patient could walk easily, and without pain or unusual fatigue. He did not require a stick for support, and he habitually took much exercise. Motion at the operated joint was as free as in the other limb; but in 1867 he unfortunately fell on the ice and struck his hip, when inflammation followed, and tough adhesions were formed.

4. Where it is not desired to obtain motion, but only to rectify a false position of the limb, the bone may be divided subcutaneously, and an improved position may be given. I performed an operation of this character, with the assistance of Dr. Richard Brown and Mr. Potter, in the year 1865; and have subsequently had occasion to repeat it. In this instance, the external wound was only sufficiently large to admit the finest saw. I prefer, however, in these cases to make a somewhat larger opening, for there is then less bruising of the soft structures. During last year, Mr. W. Adams at the Great Northern Hospital also in a similar manner cut through the neck of the thigh-bone. I think, however, that the operation of Professor Brainard, to which I have already alluded, is more simple and equally efficacious, and is therefore, for the most part, to be preferred to the subcutaneous section.

Langenbeck introduced subcutaneous osteotomy; and Meyer and Bauer have practised it during the last eighteen

years. This operation has not found favour in England, however, and I am not aware that it has been performed except by myself, until the past year, when Mr. Adams performed the operation to which I have alluded.

At the hip a false joint should be made; while at the elbow or at the knee a wedge of bone may be removed, or the ankylosis may be fractured after drilling through the bone.

When bony ankylosis of the jaw has taken place, either by fusion or by a bridge of bone extending from the lower maxilla to the temporal bone (for these osseous bands not unfrequently follow the course of the ligaments), it is necessary to divide the ramus of the jaw. Whenever it becomes necessary to divide the ramus, care must be taken so to divide it that the false joint shall be formed in front of the impediment to motion, whatever this may be; otherwise the operation will be useless. When, however, the operator has the choice of position, it is well to select the sigmoid notch; less injury is inflicted in this position, and more power remains to the patient. Whether, however, this point be selected or not, a wedge of bone should always be removed; for in all operations on healthy bone there is a strong tendency to reunion when a simple section of the bone is made. Indeed, the strongest argument that can be used against the operation is this—that, notwithstanding the removal of a wedge of bone, there is a powerful tendency to bony reunion. I have only once seen a case in which bony ankylosis had taken place simultaneously on both sides of the jaw. This resulted as a sequence of gonorrhoeal rheumatism. The case is as follows:

At twenty-five years of age the patient contracted a gonorrhoeal discharge, which was followed by synovial inflammation with effusion into both knee-joints. He was confined to the house during a fortnight or three weeks, and was then again able to walk about. At this time, however, the swelling and stiffness of the knees had not quite subsided. The urethral discharge continued for two months, and then it ceased. Before three months had elapsed, the use of the knees was perfectly restored. At

this period, he again contracted a gonorrhœal discharge, and it was followed, in the course of some few days, by inflammation of the left hip-joint, of both ankle-joints, and of the tarsal joints. The swelling and stiffness lasted longer on this than on the previous occasion, and indeed ten months passed before he was able to walk with sticks. Stiffness continued after this time yet for many months, but at length he regained the use of the affected joints.

In November 1852 a similar series of events occurred as before. On this occasion, however, both hip-joints became inflamed, as well as both ankle-joints and one knee-joint. The effusion and pain were greater on this than on any previous occasion, and he was longer in recovering. Indeed, he never entirely lost the stiffness about the hips, and had always difficulty in rising from a chair.

In 1854 he married. Articular inflammation returned with redoubled violence, without any urethral discharge being present, and attacked in succession every articulation in the body.

I found him with ankylosis of all the cervical vertebræ, and of most of the dorsal vertebræ, as well as of both hips. Subsequently, ankylosis took place of the temporo-maxillary articulations, the shoulder-joints, and the knees. And before death the entire skeleton was ankylosed: he could not even move his head.

B. E. BRODHURST.

XII. OBSERVATIONS ON SCARLET FEVER, ESPECIALLY WITH REFERENCE TO ITS EPIDEMIC CHARACTER.

SCARLATINA has been for a considerable period unusually prevalent; and it seems to me that something may be gained at the present time from an inquiry into the extent of our knowledge on the subject of its origin and mode of propagation, and the means at our disposal to arrest its spread, or aid in the recovery of those attacked by the disease. As in all other disorders of the same class, the dissemination of scarlet fever obeys certain laws, which have been more or less definitely ascertained for each member of the group of miasmatic fevers. We believe that whatever may have been its primeval origin, it cannot now be developed in any individual who has not received from some source or other the miasm which, on its introduction into the human body, excites a certain definite form of metamorphosis of tissue, to which in its totality the name of scarlatina or scarlet fever is applied. We believe that this series of changes, though abnormal, occurs in compliance with definite laws, and follows an invariable course, which must be to a certain extent modified by the force of other vital laws acting more or less energetically in different individuals; but that if life be prolonged, it will in due course terminate in the restoration of the ordinary vital phenomena. To our perceptions, the individual who has passed through this series of changes remains himself unchanged, the ordinary functions proceed as if nothing had occurred, the tissues are replaced and undergo the ordinary operations of decay and waste and regeneration just as they did before; but our experience teaches us, that in the majority of cases there can be no recurrence of this particular abnormal series.

We therefore conclude, that some imperceptible change has taken place on the tissues, to which this strange immunity is due.

With reference to the miasm itself, we believe that, though yet untraced, it must be some sensible portion of matter. It may be infinitesimally small; it may or it may not evade our most delicate means of research; but matter it must be in a state of change, and, like other matter in a state of change, liable to excite similar change in other portions of matter capable of being acted upon. That this miasm is generated in the body of the individual suffering from the disease, and is given off in enormous quantity by him, there can also be no question; though we are unable to state, or even perhaps to guess, at the number of individuals to whom the disease might be propagated from a single patient.

So far it seems to me that our deductions are based on fair logical inference, and are consequently irrefragable. But beyond this there are certain conclusions derived from experience on which we may safely rely, although the evidence in their favour is by no means so satisfactory. It may thus be admitted, that in proportion to the concentration of the miasm, the liability to infection is increased; but that there is also in the recipient a greater or smaller susceptibility, which influences the result still more than the degree of exposure. That this is highly probable will, I think, be admitted by most; and we might even go farther, and say that it is fairly established, were it not that the laws of transmission are still wholly unknown. It will also probably not be denied that the miasm itself is an organic compound, that it is not gaseous, that it is not a vapour, but that, if the infection be transmitted through the atmosphere, it is some organic matter suspended in the air or in the aqueous vapour combined with it. And here we come wholly into the region of hypothesis, and can only assign a greater or less degree of probability to the hypothesis announced. For my own part, I can see no probability of truth in that which would associate its propagation with living organisms. Even if all were granted that has been assumed in regard to the influence

of germs floating in the atmosphere on the healing process in breaches of surface, it by no means follows that the metamorphosis of tissue throughout every part of the body should be influenced by the presence of such germs on the outer surface of unbroken tissue, whether applied to the skin or to the mucous membrane, and is, in fact, opposed to the actual knowledge we possess of the action of epiphytes on either.

But I would say farther, that the analogy which has been supposed to exist between suppuration and fermentation or putrefaction fails in one most material point, inasmuch as the living organisms developed from germs are found, and found invariably, in the putrefactive process; and by the introduction of the germ in certain chemical conditions of matter, fermentation or putrefaction may be excited at will; while no such evidence has been adduced with reference to suppuration. On the other hand, it is well known that the course and progress of the healing process is invariably influenced by the presence of dead animal or vegetable matter; that, in broad outline, the law by which suppuration is excited by the dead organic thread of a silk ligature, and is not excited by a silver suture, applies to the reunion of tissue under all circumstances whatever. Consequently, if it be thoroughly established that chemically pure air will not excite suppuration, while air loaded with ordinary dust, the motes that float in the sunbeam, will as certainly do so, the explanation will be found in the law which regulates the action of dead organic matter on divided tissue in the living body.

Another hypothesis here meets us which cannot be so readily disposed of. It is alleged with some show of reason, that the exudation from the surface of the skin, and more especially the cuticle, is the main source of infection. And the theory is of importance, because upon it has been based the suggestion that the spread of the disease may be to a great extent arrested by careful inunction and ablution of the skin. I suspect that this theory, whether true or false, has originated in an error very prevalent of late years in the writings of medical men, itself the

offspring of a wrong use of terms. No expression is more common than fever poison. Persons are said to be poisoned by impure air or impure water. The poison is said to be got rid of or eliminated by the skin or the bowels, as the one or the other happens to be the organ chiefly affected by the disease. In such expressions there is a lamentable want of that precision of language and of thought which is absolutely essential to correct reasoning.

The term 'poison' has been unfortunately suggested by the circumstance, that all the symptoms take their origin in the introduction into the system of something injurious from without; the facts which have been ascertained, and the theories which have been adopted with reference to ordinary poisons, being as a consequence applied to the so-called fever poisons. In truth, there is scarcely any analogy between them; and the differences in their origin and mode of action are so great, that it would be more consistent with reason to believe that what was true of the one class would be false when applied to the other. In tracing the history of such cases, the first difference that strikes us is the infinitesimal quantity in which miasm acts on the body; and with reference to smallpox, at all events, it may be asserted that in the practice of inoculation the amount of matter introduced under the skin bears no relation to the intensity of the symptoms resulting from it. Poisons, on the other hand, act only in sensible quantities, and the symptoms bear a direct relation to the amount introduced. Next we find in the one class a period of incubation during which no signs of poisoning are shown, whereas no such condition is ever seen in the other. Lastly, from the body of the individual suffering from miasmatic disease an immense quantity of fresh miasm is constantly being given out; but we know that a person who has been poisoned cannot possibly discharge from his system more poison than he has imbibed.

Putting false analogies aside, we may, however, inquire whether there is any reason for assuming that the skin is more likely to be the medium through which the miasm of scarlatina is propagated than the mucous membrane. The two circumstances which, to my mind, offer

the strongest presumption in favour of this view are—first, the much greater extent to which the skin is involved in the course of the disease; and secondly, the late period at which infection may be caught from bedding, clothing, &c. In smallpox we have the strongest possible evidence that the most direct element in the propagation of the disease is the fluid contained in the pustules on the skin; but, at the same time, I should very much doubt whether an unprotected person would be safe from infection in a confined apartment where a patient was lying in the early stage of fever before vesication had begun. In scarlatina the affection of the skin, though so different in kind, is yet so marked and so extensive, that if the cutaneous secretion take any part at all in the propagation of the disease, it cannot fail to be an important one. And whatever may be said of other modes of transmission, I think we cannot withhold our belief that the skin is in this disease too one of the most direct media of infection.

With reference to the period during which miasm will retain its infectious character if articles of clothing, &c. be shut up in a box, I have no new facts to add; I would merely call attention to the circumstance as indicating that it must be associated with some substance of a comparatively stable character. In all infectious diseases we know that chemical change will render the miasm innocuous. Vaccine lymph requires certain precautions to be adopted for its preservation; and if the miasm of scarlet fever were only carried about in the air or suspended in watery vapour, it would probably very soon lose its infectious properties through decomposition. It seems, therefore, not unreasonable to conclude, that when the disease has been propagated afresh after a long interval, the miasmatic character has been transferred to some material which was not liable to rapid decomposition; such a material, for example, as the dry cuticular surface, which, if preserved from moisture, will remain for a very long time without undergoing any great change in chemical character. At first sight it is perhaps difficult to reconcile this condition of chemical stability with what has been already asserted of miasm generally, that it is matter in a state of

change. On farther consideration, it appears that the two conditions have no closer relation to each other than is expressed in the statement that chemical stability is absolutely essential to the development of this vital change; that any substance rapidly undergoing chemical change is incapable of developing it; and that the chief means we possess of preventing its development is the employment, in the presence of miasm, of such reagents as tend to promote chemical decomposition, so that we have no better disinfectant than free oxygen.

But while admitting the great probability of scarlatinal miasm being propagated by means of the skin and its exudation, we have still to consider how this is brought about; whether as the result of some specific secretion, or as a consequence of general change affecting all the secretions alike; and farther, whether there is any evidence to show that the miasm attaches itself more to one secretion than to another. This question has been already in part answered. If, as we have asserted, there be no poison to eliminate, there can be no special secretion; the ordinary secretions, so far as disease does not arrest them altogether, will continue to go on. But their character, though unchanged to all appearance, must have received a certain impress from the universal action proceeding in every part of the body, and this is only known to us by its capability of exciting the same actions in another. So far as analogy can serve as a guide in reasoning on such matters, I think we should naturally conclude that one secretion was just as likely to have received this impress as another, and that the relative power of each in propagating the disease depends rather on secondary causes than on its direct relation to the miasm so propagated.

The elimination theory asserts, in opposition to this view, that during the existence of specific fever a poison is generated which must be eliminated or got rid of by some secernent action, and that the selection of the apparatus employed for this purpose is the chief cause of the symptoms by which they are recognised. Two questionable statements are involved in this proposition: viz. that there

is a poison, and that it must be eliminated. To deny that there is a poison may seem paradoxical; but I merely wish to express that the word 'poison' gives a totally erroneous idea of fever miasm. Water may have a striking resemblance to alcohol, because they are both colourless fluids; but they are essentially different in most respects, and to group them under a common name would be only to cause confusion. I need not again repeat the chief points of difference; but in nothing is the distinction more marked than in the fact, that an infinitesimal quantity introduced will multiply itself almost illimitably in the individual suffering from the disease. If a man happen to have swallowed a certain quantity of opium or arsenic, we know that a foreign element is present in his constitution which must be got rid of sooner or later, the total amount remaining unchanged throughout. So long as any portion is retained, it does harm in an exact ratio to its quantity; in short, his life and health depend on the poison being eliminated. When, on the other hand, a man has imbibed a fever miasm, its quantity is infinitesimal, imperceptible; it acts as a disturbing cause in this minute quantity, and the measure of the disturbance is not regulated by the amount absorbed. After a time, fresh miasm is generated; but the individual is no longer susceptible to its influence while it remains with him, and no perceptible change in his state is produced when it leaves him. To him the quantity given off is wholly immaterial, whether he serve as a focus of infection at the commencement of his attack or during the period of convalescence. To him it is much more important, be the attack mild or be it severe, that all the ordinary functions of life should go on without interruption; the arrest of any one of them, by exposure to cold or any other accidental circumstance, is of far more consequence than the possible amount of infectious miasm generated during his illness. For him there is no elimination.

If, then, we put aside the theoretical argument derived from the supposed necessity for the elimination of the poison, there remains, as it seems to me, no reason for believing that any specific secretion is concerned in the

propagation of scarlet fever. No one who has watched its progress can doubt the extent to which the blood and tissues are involved; can doubt that though the skin-affection be one of the most prominent symptoms, it is by no means a primary element in the disease. Neither can we withhold our belief, that the action taking place in the skin is produced by and dependent on the more general affection. Were farther proof necessary that the skin only becomes a medium of infection in consequence of this circumstance, it seems to be afforded by the fact that in this disease the specific action which specially marks its place among miasmatic fevers affects the mucous membrane as well as the skin, producing ulceration of the throat in a large number of cases. The conclusion seems unavoidable that, so far as we at present know, any secretion, or more probably all the secretions, may contain matter in a state of change, which, when meeting with other portions of matter capable of undergoing the same series of changes, is liable to excite them, except when prevented from doing so by some chemical or vital law. In fact, it seems not improbable that the secretions themselves, while not otherwise sensibly modified, have this special impress stamped upon them by their coming from an individual for the time suffering from the disease.

The importance of this conclusion is to be measured by the number and variety of the secretions, and the wide range of possible sources of infection which it opens up to us. And when we remember that the number of instances in which the mode of propagation has been successfully traced is excessively small in proportion to those in which there has been no discoverable exposure to infection, it would seem reasonable to assume that the means by which the miasm is carried are very various. It is consistent with the experience of all who have seen much of scarlet fever, that sometimes the infection is caught from a patient in the very earliest days of the fever; that in other cases the source of infection is a child in the stage of convalescence who has not yet completely desquamated; while in other instances the miasm is carried about by a person who has completely recovered from the disease,

and from whose body we cannot suppose that any morbid exudation is given off, and then we assume that it has adhered to his clothing. Different minds will probably arrive at different conclusions in considering the probability of infection spreading at each of these stages. For my own part, I should not hesitate to say that I thought a susceptible person would run the greatest risk if he were shut up in a close room with a patient in the earlier days of the fever, and that when the fever had completely subsided, pretty close contact with the bedding or clothing would be required, unless the susceptibility were unusually great. The desquamative stage is hypothetically assumed to be the most dangerous; but it may well be asked, Is it found practically to be so? Is it not, on the contrary, quite notorious that in houses in which the disease spreads, fresh cases arise at much shorter intervals than would be embraced by the desquamation of one patient, and the incubation of the disease in another before the fever appeared? In fact, it is quite exceptional that so long an interval occurs between the first and the last case in a house as to render this explanation possible. I confess that I am forced to adopt the conclusion that, like typhus, in which there is no sore-throat, no necessary cutaneous eruption to suggest any special channel of impregnation, scarlet fever spreads chiefly in consequence of the atmosphere becoming loaded with the various exudations from the body of the sick; not because they constitute some new secretion, but because they have derived certain peculiar characters from the general perversion of all the vital functions together.

Another question of no small importance here suggests itself. How is it that if the disease is only spread by miasm, it can at any time be spoken of as more or less than usually prevalent? We might suppose that the infection being brought to a district, it would attack every susceptible person, or at least every such person brought within reach of its influence; and then that it would of necessity die out, and be no more heard of in that locality till a new generation had sprung up and a fresh importation of the miasm had occurred. Or we might suppose it

possible that the miasm was never quite extirpated, but as each susceptible individual was accidentally brought into contact with it, he passed through an attack, and if his life were spared, he would be removed from the list of the susceptible to the non-susceptible. But there is something more than this. Scarlatina becomes, as it has done lately, unusually prevalent; the infectious disease becomes also epidemic. Of this circumstance it is extremely difficult to offer any satisfactory explanation; but we may well inquire to what extent this statement is true, and what constitutes an epidemic of scarlet fever.

Few diseases offer a better opportunity for such an inquiry than scarlatina. Like smallpox, it is one of the most infectious of the miasmatic class; but, unlike that disease, there is no known means of prevention, which by its greater or less extensive use can modify the progress of the epidemic. It is also in its broad outline not very difficult to recognise, if we assume, as is I think always done, that all the varieties are one and the same disease, the miasm of a mild case being quite capable of generating in another person a very severe form of the disorder. In fatal cases especially the diagnosis cannot be said to be very difficult; and the percentage of error, either in consequence of other diseases being included under the head of scarlatina, or scarlatina cases being recorded under some other name, cannot be very great. Unfortunately we have no statistics of the disease apart from the deaths caused by it, from which any deductions might be drawn which could be of the least value. The death records are alone available; and they are tolerably reliable, especially in estimating the relative general prevalence of scarlet fever in the same locality at different times.

In making use of the statistics of mortality, it must never be forgotten that the number of deaths cannot really represent the amount of sickness in any given district at any particular time, as compared with some other time and place, because—first, the ratio of deaths to recoveries is known to vary in proportion to the severity of type prevailing at the time; secondly, in poor districts, where the sanitary conditions are less favourable, the

number of deaths is always relatively greater than in districts where the inhabitants chiefly belong to a better class of the population; and thirdly, in such a city as London, the worst cases may be removed to hospitals out of the district, and may thus unfairly raise the death rate in one district while lowering it in another. I do not therefore propose to institute any rigid comparison between one part of the metropolis and another, but merely to trace the general outline of the recent epidemic, and then, selecting particular districts, point out how at one period the disease seems to die out altogether, and at another a few isolated cases occur from week to week or month to month; but that when the disease becomes really epidemic, the number of fatal cases rises rapidly, maintains a maximum for some weeks, and then again resumes its ordinary proportions.

It must be borne in mind, that in so large a field as the metropolitan area every form of epidemic disease indigenous to this country may be found in greater or smaller numbers at all times. London is never wholly free from the presence of scarlet fever. The total deaths from this cause vary in different years; but the lowest mortality for the last ten years was that recorded in 1867, when the whole number was 1438, or at the rate of 27·7 per week. The smallest return was that for the twentieth week ending on the 18th May, when only 12 deaths were recorded; the maximum was attained in the forty-fourth week ending on the 2d November, when the deaths numbered 54. During the following year a considerably greater number of persons died from scarlet fever, and the weekly average was 55·1.

The year 1869 opened with a high death rate from this cause, and in the first week 69 deaths were recorded; but the disease still presented no epidemic character, for in the eleventh week ending on the 20th March, they had fallen to 33. This number was the minimum for that year. Towards the end of June the fluctuations which marked the earlier months of the year gave way to a steady rise, which continued throughout the months of July, August, and September, reaching its maximum in

October and the beginning of November. From this time the weekly returns of mortality showed a pretty steady decline in the number of scarlatina deaths till the following April and May, when they once more began to rise, again reaching a maximum in October last. The particulars are given in the subjoined table.

In the early part of the epidemic it was observed that the disease prevailed more extensively in the Eastern districts of London than elsewhere, and that it soon spread to the Southern districts, while the Western parts of the metropolis enjoyed a comparative immunity from its inroads. It seems desirable, therefore, to compare its progress in each of those groups of districts with the account which has just been given of its prevalence in London generally. In the year 1867, the average weekly mortality from scarlet fever was in the East districts 4·6, and in the South 9. A maximum of 11 deaths was recorded in the East districts in the ninth week ending on the 2d of March, and in the South districts a maximum of 19 was recorded in the thirty-third week ending August 17th. A single death was in each group recorded only once, viz. in the thirty-first week, ending August 3d, for the East districts; and in the twenty-first week, ending May 25th, for the South districts. In 1868 the weekly average for the Eastern group was 10·3, and for the South 13·4. In 1869 the first week gave a mortality of 15 in the East and 13 in the South, and the average weekly mortality for January was 16·8 and 13·8. During the next five months this average was somewhat exceeded in the East districts; but in the South districts the mortality fell very much below it for three successive months, having only numbered 4 in the last week of February. In June it began to rise in this group, and in July the evidence of an epidemic having commenced in both was clear and distinct.

The following table of weekly averages of deaths for London and the East and South districts calculated for each month may prove interesting, and I need only premise it with the statement that at the census of '61 the population of the East districts was over 20 per cent, and

of the South districts nearly 28 per cent, of the whole metropolis.

Deaths from Scarlet Fever. Weekly averages.

	London.	East.	South.
1869—June	60·3 . . .	20·8 . . .	14·3
„ July	80·0 . . .	30·2 . . .	20·3
„ August	122·3 . . .	42·8 . . .	24·5
„ September	179·5 . . .	62·5 . . .	49·5
„ October	228·0 . . .	76·0 . . .	87·5
„ November	221·5 . . .	66·8 . . .	76·0
„ December	190·8 . . .	54·3 . . .	65·5
1870—January	133·6 . . .	36·0 . . .	47·0
„ February	106·3 . . .	21·3 . . .	38·5
„ March	71·0 . . .	13·5 . . .	24·5
„ April	72·8 . . .	9·6 . . .	23·2
„ May	80·3 . . .	9·0 . . .	21·8
„ June	97·3 . . .	9·8 . . .	29·5
„ July	99·8 . . .	8·6 . . .	31·6
„ August	116·5 . . .	11·3 . . .	39·8
„ September	154·5 . . .	17·5 . . .	53·4
„ October	184·0 . . .	24·2 . . .	67·0
„ November	152·0 . . .	18·0 . . .	38·2
„ December	119·0 . . .	12·6 . . .	45·0

Here we find that the maximum in each group of districts corresponds in time with that of the whole metropolis in both years, and also that this maximum occurs about the same period in each of the two years. But it will be observed, that the epidemic character of the disease in the second year is barely traceable in the Eastern districts, while it is distinctly manifest in the South districts. In order to bring out the meaning of these facts, I have calculated the weekly averages of the several districts which are included in each of the larger groups. By following nearly the Registrar-General's divisions, I have formed of the East districts five pretty natural groups of nearly equal population with one prominent exception, viz. Bow and Poplar, which stand also somewhat apart from the rest. The population of the South districts is to that of the East very nearly in the proportion of four to three; but here I have found it impossible to form the sub-districts into groups which shall at the same time contain nearly the same number of inhabitants, and also be so close together as to be under the same general influ-

ences, and the question arises, how far this difference in the character of the districts modified the death rate in the East and South during the two successive years.

The several groups of sub-districts are composed as follows:

East Districts.

Groups.	Population in 1861.
1. Shoreditch, Hoxton, and Haggerstone . . .	126,354
2. Hackney and Bethnal-green	101,913
3. Spitalfields, Whitechapel, Mile-end New Town, and St. George's-in-the-East	127,961
4. Shadwell, Ratcliff, Limehouse, and Mile-end Old Town	129,686
5. Bow and Poplar	79,126

South Districts.

Groups.	Population in 1861.
1. The Borough-road, St. Saviour's, Kent-road, Newington, and Walworth	173,900
2. St. Olave's, Southwark, to Bermondsey and Rotherhithe	101,913
3. Waterloo-road, Lambeth, Kennington, and Brix- ton	172,044
4. Clapham, Battersea, Wandsworth, Putney, and Streatham	70,403
5. Dulwich, Camberwell, and Peckham	72,488
6. Deptford and Greenwich	85,975
7. Eltham, Lee, Lewisham, and Sydenham	31,979
8. Charlton, Woolwich, and Plumstead	75,473

In order to show more distinctly the bearing of the epidemic on each of these groups, I have placed together in the following table the weekly average of mortality for the whole of each year, and that for the last seventeen weeks during which, as seen in the previous table, the greatest average weekly mortality occurred, when we may therefore assume that the epidemic was at its height:

East Districts.

	Groups.				
	1.	2.	3.	4.	5.
Weekly averages for 1869 . . .	7.0	8.3	6.9	7.6	7.5
Last seventeen weeks . . .	12.9	16.2	11.8	11.0	14.0
Weekly averages for 1870 . . .	4.0	2.8	1.9	3.5	3.3
Last seventeen weeks . . .	5.0	3.2	3.2	4.8	2.6

South Districts.

	Groups.							
	1.	2.	3.	4.	5.	6.	7.	8.
Weekly averages } for 1869. . . . }	8.2	8.4	3.8	2.6	3.0	3.5	0.7	0.9
Last 17 weeks .	19.2	17.5	6.8	5.0	6.9	7.6	0.6	1.9
Weekly averages } for 1870. . . . }	5.9	3.6	9.2	6.7	3.9	4.3	1.5	4.0
Last 17 weeks .	6.9	3.3	12.3	13.2	5.0	6.0	1.7	5.8

From tables of mortality too lengthy to be reproduced here, it has been ascertained that in groups 1 and 4 of the Eastern districts, the total deaths due to scarlet fever in the two years were 565 and 575 respectively, and relatively to population in nearly the same ratio in each. The epidemic influence is exhibited very much in the same manner in both, and the difference between them consists chiefly in the circumstance that the mortality was higher at the beginning of the year in group 4, and never reached the same maximum as in group 1. In group 2 the deaths were much more numerous; and if it be assumed that the population still retains the relative proportions of 1861, the excess would be represented by a ratio of 66 to 45, or 3 to 2 nearly, the actual deaths for the two years having been 673. Here too the epidemic influence is displayed in the highest degree, and the weekly average for the month of October is higher than that of any other district throughout the year.

Group 3 presents the contrast of the lowest total as well as the lowest relative mortality; the average for each year is lower than in any other group, and although following nearly the same course as in group 1, the maximum reached in either year was never so high.

In group 5 there are certain peculiarities which deserve notice. In proportion to the population of 1861, the total number of deaths (557) was relatively the greatest, as was also that of the seventeen weeks at the close of last year; but the period of the greatest mortality was later in the season, and the weekly average for November bore exactly the same ratio to the population of 1861, as

the October average in group 2, although the number in the latter was apparently higher.

The groups of South districts, following the same general laws, differ materially in several respects from those of the East districts. In all but the two first the mortality was greater in the second year of the epidemic than in the first, and in no two of them is there any close correspondence. The size of the groups varies so much, that a mere comparison of the weekly averages gives little information; and the only really useful contrast is that between the rates of mortality as expressed in the weekly averages for the two years, and the last seventeen weeks of each year. I need only say, that with reference to the population of 1861, the rate of mortality was highest in group 4, and lowest in group 7, in the proportion of about 7 to 3, taking the two years together, the intermediate districts coming in the following order: group 2, 5, 6, 1, 3, 8 in varying degrees of intensity.

It is also to be remarked, that there are greater variations as to the time at which the maximum was reached in the South than in the East groups of districts. In group 1 the total deaths for 1869 did not greatly exceed those for 1870; but the highest weekly average (22·3), which occurred in November 1869, was more than double that which occurred in any month of the following year. In group 2 the maximum (19·2) attained in October 1869 was three times greater than the average of any month in 1870, the total deaths for the two years being 429 and 189 respectively. In group 3 the conditions are nearly reversed. The deaths of 1869 numbered only 194, while those of 1870 amounted to 489. The weekly averages rose month by month from June to January, when a maximum of 10·8 was attained; they fell to 3·6 in April, and a second maximum of 14·6 was reached in October 1870. A similar result is obtained from calculating the weekly averages in group 4, where the total deaths for 1869 were 132, and for 1870, 354. The first maximum of 6·2 was reached in October 1869; the average fell to 2·0 in the following March, and reached a second maximum of 16·8 in October of that year. The maximum for group

5 was attained in October 1869; but a large number of deaths was recorded during the latter part of the following year, so as to raise the total deaths and the average for the last seventeen weeks above those of 1869. In group 6 the results were very similar; but in group 7 there is scarcely any evidence of epidemic influence at all, the maximum for the two years having been attained in July 1870, when the average weekly mortality was only 2·6. In group 8 the average weekly mortality for 1869 was nearly as low; but it rose during the last two months of that year, and maintained nearly the same rate till towards the end of 1870, when it reached 8·2 in October, and remained at 7·6 in December last.

In another form a very similar result is obtained by taking the highest three weeks together throughout the epidemic for the whole of London, and the East and South districts, and for each group of which they are composed. The following table gives the total deaths occurring in the three highest weeks in each, with their respective dates of commencement:

London: highest 3 weeks commencing Sunday Oct. 17, 1869 . . .	703
East: ditto, Sept. 26, 1869	241
South: ditto, Nov. 21, 1869	243

East Groups.

1.	2.	3.	4.	5.
1869. Sept. 26.	Sept. 26.	Sept. 12.	Nov. 7.	Nov. 21.
59	66	57	41	57

South Groups.

1.	2.	3.	4.
Oct. 24, 1869.	Nov. 21, 1869.	Oct. 9, 1870.	Sept. 18, 1870.
72	73	51	58
5.	6.	7.	8.
Oct. 17, 1869.	Oct. 31, 1869.	Sept. 4, 1870.	Oct. 9, 1870.
37	37	9	27

Let us now observe what happened at the same time in the district of Chelsea, one of the groups of the Western district. In 1867 the deaths from scarlet fever were only 16 altogether. One occurred in March, 1 in June, the

majority in July and August, 2 in September, 2 in October, 1 in November, 1 in December, 4 in January 1868, and none from that period till the middle of April. From that time they gradually increased, till the weekly average amounted to 8·4 in October and 10·5 in November, when they again began to decline, giving a total for the year of 157 deaths.

In 1869, the year of the greatest mortality throughout London, the deaths fell to 35. From the last week in April to the first week in October only one death occurred. During the remainder of the year the deaths were about one each week, an average which was but slightly exceeded during the first four months of 1870. In May it rose to 4·8, and attained its maximum of 8·5 in August; the highest three weeks of the epidemic having begun on the 31st July, and in this period a total of 29 deaths was recorded. During the year 1870, 239 deaths occurred in a population numbering 63,439 at the census of 1861.

One very striking fact is brought out by this examination—viz. the influence of season on the spread of the epidemic. The highest mortality even in small districts seems to cluster round the months of October and November, and taking the whole metropolitan area into consideration, belongs especially to the former month. Exceptions will necessarily occur in certain districts, and thus we have found it attain its maximum in Chelsea in August 1870; while in one of the Southern groups of districts the second maximum in October 1870 was not very much higher than that of the previous year, which was only reached after Christmas.

But while giving its due weight to atmospheric influence, we cannot assume that this is the chief element in causing the spread of an infectious disease such as scarlatina. The miasm may pervade a district, the number of deaths may be on the increase through the summer months, and yet no epidemic supervene. This is exactly what occurred in the district of Chelsea in 1867. Throughout the early part of the year only two fatal cases were recorded; during the months of July and August the scarlatina deaths were one a week; but in the last eleven weeks

of the year there were only two deaths produced by this cause; and it was not until the following July that the infection spread to any considerable extent. In the year 1868 the epidemic influence was so great, that any two successive weeks of October or November yielded as large a mortality from scarlet fever as the whole of the previous year, and yet not a single death was recorded during the months of February and March.

From this point of view the fact is very important, that in the year 1869, when the mortality from the epidemic reached its highest point for the whole metropolis in the month of October, cases of a malignant type began to show themselves in Chelsea during that and the following months, causing considerable anxiety as to the health of the district; and yet the deaths were not sufficiently numerous to indicate the existence of an epidemic, and no real spread of the disease in the district can be traced until the following year, when the influence of season again makes itself felt.

To my own mind, the inference is unavoidable that, under certain circumstances with which we are at present unacquainted, the miasm acquires unusually infectious properties; and that when in this condition the disease is introduced into a district, it assumes an epidemic character which it does not possess under ordinary circumstances, the actual results of this unknown factor being more or less influenced by other agencies. Among these we must place, perhaps, in the first rank atmospheric causes, as tending to its propagation at certain seasons; next in order come all those conditions of a population which bring its individual members more or less directly into contact with the infectious miasm; thirdly, when considering the death rate only, we must not lose sight of those sanitary defects which lower the general health, especially if combined, as they so often are, with poverty and starvation, when they render the victims of disease so much less capable of resisting its attack. It is so impossible to separate the respective influences of these several circumstances, that no trustworthy results could be anticipated from an inquiry into the extent to which the mortality was affected

by the amount of overcrowding, the want of ventilation, the condition of the drainage, and the state of the water supply, or from the still more difficult investigation of the consequences of poverty and starvation.

The whole evidence collected in the preceding pages points in this direction. It shows that from a comparatively quiescent state the disease may at any time become epidemic, and that in particular districts the maximum of the epidemic may be earlier or later, but that it is usually at its lowest in spring and its highest in autumn. It shows too, that it does not spread by contiguity from one neighbourhood to another, but that a large district is involved at the same time and in the same manner. It would take too long to carry out this inquiry in other districts of London; but it is enough to observe, that, with certain modifications, all those comprised in the term East districts were affected in much the same way by the epidemic; whereas, on the South side of the river, closely contiguous localities are marked by an interval of a whole year in the period of the greatest mortality. To the east of Blackfriars the greatest ravages of the disease were seen in 1869; westward it prevailed much more in 1870. Then, again, in the outlying districts similar contrasts are seen. Deptford and Greenwich are remarkable from the maximum weekly average being found in the month of November 1869, while the total scarlatina deaths for that year were fewer than those of 1870. In Woolwich and Plumstead the whole force of the epidemic fell on the latter year, no trace of it being perceptible before November 1869; but in Eltham, Lee, and Lewisham, which might almost be said to lie between the two previous groups, very slight evidence of epidemic influence is to be found at all. It is true that throughout the year 1870 the scarlatina deaths were more numerous than in the previous year, and that the chief mortality occurred in the four months from July to October inclusive; but during the highest three weeks of the year, as already shown, the deaths only amounted to 9 in a population of 32,000 at the census of 1861. The contrast is sufficiently striking between this number and the 58 deaths given in the

same table as the aggregate mortality of three weeks in the same month in the group of districts round Clapham, with a population of about 70,000 at the census. Great or small as the influence may seem to be, it belongs to the very same epidemic in each case, and any explanation which may be offered of its spread must take note of such phenomena as these. To my mind, this immunity of a particular district while surrounded by infection, in spite of a certain number of fatal cases occurring within its limits, is one of the most difficult problems which we have yet to solve.

With reference to the means at our disposal for arresting the spread of the disease and aiding the recovery of those who are already under its influence, few words may suffice, as they are subjects now so well understood by the majority of well-educated medical men. We have assumed, that the phenomena of abnormal vital action are excited by some portion of organic matter which is at the time of its entrance into the body in a state of change, and that the whole of the tissues may or do pass through a series of analogous changes, so that any effluvium or particle of matter given off is liable to excite the same changes in another person. Experience teaches that the miasm so given off is to a certain extent unstable, and may be rendered innocuous by chemical decomposition, and we therefore turn to chemistry for means to accomplish this end. The agents which have hitherto been chiefly employed may be divided into three classes—deodorisers, antiseptics, and disinfectants, according to their most prominent effects. Such terms are necessarily only relative, and do not imply that their action is limited to that which is exactly defined by the strict meaning of the word. Among deodorisers I would class such substances as Burnett's solution and the perchloride of iron, which at once deprive sewage and decaying animal matters of their fetid smell. They possess, in common with many other metallic salts, powerful chemical affinities, and will more completely neutralise free ammonia and decompose sulphuretted hydrogen than many other substances which are perhaps of more real value as disinfectants. At the

same time it is probable that this power of decomposition extends beyond their more sensible effects to the organic miasms which accompany the fetid gases. It is not unlikely too that the chlorine they contain may be of some importance, though its action must be very different in such forms of combination from that with which its presence is usually associated in our minds. Antiseptics belong to a different class, and it is difficult to say to what extent they act as deodorisers, because the smell of the substance itself is usually so powerful. The one great representative of this class is carbolic acid in its various forms. Its power seems to consist in restraining organic matter from passing into that series of chemical changes to which it is liable as soon as it is removed from the controlling power of vital action, an effect which may be hastened or retarded by a variety of causes. If fever miasm consisted simply of matter undergoing putrefactive change, there could be no question that carbolic acid would be the most certain disinfectant; and it is not unreasonable to believe, that if it possess the power to restrain putrefactive change, it may also arrest that other series of changes which converts the exudations from the sick into a means of propagating disease to the healthy. With this idea it has been very much employed of late, and possesses the advantage of being very diffusible through the atmosphere, and of indicating by its odour, which is not disagreeable to most persons, the extent to which this diffusion has taken place.

True disinfectants must consist of those substances which deprive the organic matter of its power to excite in any other living body that tendency to change which itself is for the time being subject to. The principle of their action would seem to be, that by chemical affinity the peculiar tendency of the organic particle is altered so as to bring it under the ordinary laws of decaying animal matter. Great heat and oxygen gas possess this power in the highest degree; and it is not improbable that all the substances employed as simple disinfectants owe their power to the fact that they tend to set oxygen free. Thorough ventilation of the sick-room acts not only by diluting the miasm and carrying it away as speedily as

possible, but also by exposing it more freely to the action of the oxygen contained in the atmosphere. At the same time it would seem that oxygen liberated from some chemical combination acts most energetically in its nascent state, and hence chlorine gas and the permanganates are believed to destroy fever miasm more perfectly than any other agents. Unfortunately the vapour of chlorine is very irritating, and the permanganates are not diffusible through the atmosphere. The effect attributed to the burning of sulphur with the escape of sulphurous acid gas is probably explicable, though less directly, in the same way. To those who are inclined to hold the germ theory of disease it might offer some corroboration of their view, that this acid is especially destructive of the lower forms of vegetable life. The same remark will also apply to such temperatures as are employed for depriving articles of clothing of infection; for the very same degree of heat serves to destroy the life of the lower organisms, though they survive a temperature which the higher classes of animals cannot withstand.

In the earlier part of this paper I have endeavoured to show that the skin is not in all probability the only medium of conveying infection, but that its minute scales are very likely to retain it longer and convey it to a greater distance than any other exudation. It is therefore essential that, while every precaution is taken to preserve the purity of the atmosphere in the sick-room, special care should be taken that the clothing and bedding are thoroughly disinfected. The plan of inunction which has been recently suggested would seem to have this one recommendation, that during the stage of desquamation the minute particles are more likely to be scattered about the room, and perhaps carried about in the atmosphere, if the skin be dry than when it is moistened by an unguent; but it does not in the least degree render the adoption of other measures less necessary, both during the attack and after the patient has been removed from the room; the absolute prevention of the escape of a single particle of cuticle would not restrain the spread of the disease through other channels.

The day has gone by for punting after specific modes of treatment, and it is not likely that any substance will ever be discovered capable of arresting such a series of vital changes as those implied in the term scarlatina. We may hope too that the day has gone by when it could be assumed that the fever might be arrested by active depletion, or that the advantage gained in any lowering of the pulse by such means compensated for the loss of sustaining power so eminently necessary to carry the patient through the attack. Cases still occur in no small numbers in a severe epidemic in which the patient is struck down at once, and never rallies from the excessive disturbance in the condition of the blood which ushers in the disease. But in a greater number of instances the period of danger comes on a little later, when the blood change has proceeded farther, though less rapidly. In the latter we find that the failure is due to its want of power to stimulate the organs to which it is supplied, and we can very frequently increase this power by giving stimulants both diffusible and alcoholic. The delirious brain will become calmer and the irritable pulse quieter under their administration. Applying the same principle to the more rapidly fatal cases, we should be disposed to argue, that if they can be saved at all, they must be saved only through the liberal administration of stimulants; but I do not know that in such states the very largest amount of stimulant ever given has served to sustain life.

Another point to be borne in mind is, that the power of ultimate recovery will be to a certain extent proportionate to the degree of strength maintained throughout the illness. To this, judicious feeding mainly contributes; and we cannot doubt that some portion of the food is assimilated, probably serving in great measure to prevent waste of tissue, but also in some small degree supplying the place of that which is taken up into the circulation. At the same time it must be admitted, that harm is sometimes done when the food is excessive in quantity as well as when it is inferior in quality. Milk has of late years come to be largely used in addition to or in

place of the invariable beef-tea for patients suffering from febrile diseases. My own experience has led me to believe it to be very generally preferable. It contains all the elements necessary for healthy growth and nutrition, some of which are not found in beef-tea at all, and are consequently either omitted altogether in the patient's dietary, or are administered in forms less easily assimilated.

To what extent, it may be asked, do stimulants contribute to this end—viz. the sustaining the powers of life and contributing to ultimate recovery? There are two considerations which seem to me to bear especially on this point, and ought, to a great extent, to guide our employment of them. Alcohol in its pure state has been shown to act not only as a stimulant, but also as a means of retarding the metamorphosis of tissue; and whether in this sense it ought to be considered as food or not, it at all events possesses certain additional nutritive qualities in the forms in which it is ordinarily administered. It follows from this, that, if alcoholic stimulants are required for other purposes, we may rely on their contributing to the preservation of life, but that they cannot be trusted to either chiefly or alone for this purpose. On the other hand, their action on the digestive apparatus may in some cases supply a stimulus which is deficient in the unhealthy blood, and render these organs more capable of completing their normal processes, just as it serves to make a delirious brain more coherent. Indeed, in many cases, times occur when no food of any kind can be properly digested, and the intestinal canal becomes distended with flatulence; every form of nutriment must then be abandoned for a time, and nothing given except the alcoholic stimulant. But just as excess in stimulants in health will produce nausea, depression, and biliary disturbance, so in disease we must be careful to subordinate them to other forms of nutriment, and to have regard to the actual necessity for their administration. So long as food is taken well, and the digestion does not seem to fail; so long as the circulatory and the nervous systems do not point to the need of stimulus, it seems unwise to have

recourse to them too early. Sooner or later, in larger or smaller quantities, they must find a place in almost every case of scarlatina; but in every instance it should be a matter of thought and consideration, and not one of mere routine practice, when stimulants are ordered. When the necessity is great, they must be given without stint, at least for a time; and the unexpected rallying of patients suffering under very severe forms of the disease is at once the justification of the treatment and the explanation of the excessive mortality so often found among the poor.

In concluding these imperfect observations, I can only say that the results of the examination into the epidemic influence of scarlet fever have not been arrived at by any attempt to corroborate preconceived ideas. To a certain extent they have run counter to my anticipations; and if I have failed to elucidate the law of its spread, it has been from no want of honesty of purpose in dealing with the facts before me. The district of Chelsea, with which I am familiar, has offered me no clue to track the maze more tangible than that of the East and South districts, with which I am only acquainted in a very superficial manner. But it is well that we should now and then take stock of our knowledge, and ask ourselves what scientific progress has actually been made. In treatment undoubtedly much has been gained; and I can also say, from my special knowledge of the subject, that, by active measures of prevention, the ravages of the disease, great though they may have been, were in many cases very much restricted. It was rather the exception, when the cases were early discovered and actively watched, that any spread of the disease throughout a house occurred, in spite of the impossibility of separating the sick from the healthy in the crowded dwellings of the London poor. But we are yet perhaps as far as ever from wholly eradicating such epidemics as the one which has prevailed so extensively during the last two years, and is now being followed so rapidly by another of smallpox.

A. W. BARCLAY, M.D.

XIII. ON THE RELATIVE INFLUENCE OF BREAD, HONEY, AND SUGAR UPON THE AMOUNT OF UREA AND SUGAR EXCRETED IN DIABETES.

THE following observations upon the amount of sugar and urea excreted by diabetic individuals during the consumption of regulated quantities of bread, honey, and white sugar, were made upon three patients who were under my care in the Hospital during the year 1870. The experiments of which these observations are the result were commenced without the slightest intention of using them for the purpose of supporting or refuting any existing theory regarding the nature of the disease, and without much expectation of throwing any light upon its true pathology. In the course of them, however, certain unexpected facts came out, which, so far as they are of value, seem opposed to the purely chemical theory, which regards this disease—at all events, in its earlier stages—as a simple arrest in the oxidation of sugar either taken with or formed from the food. To these facts, and to the conclusions to which, in my opinion, they would seem to lead, I shall presently allude, after giving the details of the experiments, which were undertaken with the following objects:

1. To ascertain, by accurate daily estimation of the water, urea, and sugar excreted by the kidneys, how far these constituents vary from day to day independently of any alterations of diet, and from causes which must therefore be supposed inherent to the disease.

2. To ascertain whether the administration of honey, as recommended and practised by some physicians, is likely to prove of advantage in the treatment of diabetes; accepting as a proof of its probable beneficial effects any

facts tending to prove that the consumption of honey is followed by a lessened excretion of urea, and therefore by a diminished waste of tissues; provided that at the same time it does not lead to an aggravation of the other symptoms of the disease.

3. To test by experiment whether the administration of bread, or the increased consumption of it, is accompanied by such a decided and permanent increase in the amount of sugar excreted as to justify us in disregarding the craving which all diabetic patients have for this or some other form of amylaceous food, and altogether prohibiting its use in the treatment of this disease.

4. As a simple matter of curiosity to compare the effects of a combination of fruit and grape-sugar, as represented by honey, with that of the same quantity of pure cane-sugar.

In making these experiments, the urine was always collected from ten o'clock one day to ten o'clock the next; and the sample submitted to analysis was invariably taken from the whole of the urine previously mixed. Consequently, the estimation made on any given day was made upon the urine passed during the previous twenty-four hours. So also, when bread, honey, or sugar was given, the consumption of this commenced twenty-four hours before the period at which a specimen of the mixed urine was taken for analysis. As the whole of this was usually eaten in a few hours after it was given, and certainly always before night, it may fairly be supposed that the mixed urine taken for analysis on the following morning contained any evidence which was forthcoming of the effect of these aliments upon the system.

The sugar and urea were estimated by volumetric analysis; Fehling's copper solution was employed for the former, and Liebig's process, with nitrate of mercury solution, used for the latter. The volume of urine passed is given in cubic centimetres, and all weights calculated in grammes.

The first experiment, the particulars of which are given on p. 195 in a tabulated form, was made upon the urine of a man named Thomas Jones, a carpenter, *æt.* 50. This man

Determinations of Urea and Sugar in the Urine of Thomas Jones.

Date.	Volume of urine in cubic centes.	Specific gravity of urine.	Percentage of urea.	Percentage of sugar.	Amount of urea in grammes.	Amount of sugar in grammes.	Treatment.	Diet.	Remarks.
May 20	3010	1024	1.25	5.88	37.63	177.06	Opil gr. j. ter die.		
21	1760	1029	2.00	5.25	35.20	92.63	Do.	Mutton-chop for breakfast, 6 oz. of cooked meat, greens, 6 bran biscuits, 4 captain biscuits, 4 eggs, 1 pint of milk, 1oz. of butter and tea.	<i>Experiment with Honey.</i> May 24. Slight increase of urea and considerable increase of sugar.
22	2272	1024	1.04	5.43	33.62	128.47	Do.		May 25. Large increase of urea and very large increase of sugar.
23	2669	1024	1.11	5.91	30.09	167.00	Do.		
24	3408	1024	1.09	5.86	37.40	200.00	Do.		
25	4657	1024	1.00	5.36	46.44	250.00	Do.		
26	2726	1023	1.23	5.25	39.80	143.47	Do.		
27	2953	1024	1.23	5.61	36.61	165.79	Do. Haustus	May 23. Do. with 8 oz. of honey.	May 26. Urea and sugar fall to their previous amount.
28	3805	1023	1.31	4.34	50.11	165.40	Do. [seuss 3ij.]	May 24. Do. do.	May 28. Very large increase of urea, without apparent cause.
29	3748	1022	1.26	5.05	47.22	191.22	Do.	May 25. Do., honey omitted.	
30	2896	1024	1.51	5.26	44.01	152.42	Do.		
31	2754	1024	1.23	5.61	34.14	154.72	Do.		

was known to have been suffering from diabetes for four months, and at the time the determinations of the amounts of urea and sugar in his urine were commenced had been six weeks in the Hospital. During this time he had been at first entirely deprived of amylaceous food, and treated with opium. Under this treatment he had somewhat improved in health, his weight had slightly increased, and the specific gravity and amount of urine passed had both considerably diminished. For four days previous to the commencement of these estimations he had been allowed, at his own request, four captain's biscuits daily.

The diet and medicine taken during the experiment will be found in the table, p. 195, in which the particulars of the experiment are detailed. The man remained five weeks afterwards in the Hospital, and was then sent to the Convalescent Hospital at Wimbledon. At this time he was improving in health, and the amount of urine and sugar excreted diminishing. This was estimated on the day he left, and found to be 2612 c.c. of urine, containing 118 grammes of sugar.

Whilst at Wimbledon no restrictions were placed on this man's diet; and he gained during the five weeks he was there six pounds in weight. He then returned to the Hospital, and was there subjected to other experiments, an account of which will be found further on in this paper.

This experiment was made simply with the object of observing the effect which a certain weight of honey taken with the food would have upon the amount of urine, urea, and sugar excreted.

In this case the determinations of urea and sugar were continued during twelve consecutive days; and the only experiment attempted was that of administering for two days in succession 248 grammes of honey, which is equivalent to 197·56 grammes of a mixture of fruit and grape-sugar. Omitting from the calculation the urine passed on the days when the honey was taken, the average daily amount of urine excreted was 2859 c.c., its specific gravity 1024, the percentage of urea 1·29, and that of sugar 5·25; the absolute amount of these constituents being respectively 34·24 and 152·31 grammes.

In this, as in every other instance in which these estimations were made—as may be seen by reference to the tables—considerable variation occurred from day to day in the amount of urine, urea, and sugar excreted, entirely irrespective of any change of diet. Thus the lowest amount of urine passed was 1780, the highest 3805 c.c., making a difference of 2025 c.c. The lowest amount of urea was 30·09 grammes, the highest 50·11 grammes, making a difference of 20·02 grammes; and the lowest amount of sugar was 92·63 grammes, the highest 191·22 grammes, making a difference of 95·59 grammes. The average, how-

ever, of the ten days was 2859 c.c. of urine; its specific gravity was 1024; the percentage of urea 1·24, and that of sugar 5·25, the absolute amount of these constituents being respectively 38·24 and 152·31 grammes. Taking the average of the four days previous to that on which the honey was first administered, we find that the volume of urine passed was 2403 c.c., the amount of urea 34·13 grammes, and that of sugar 135 grammes. On the first day of giving the honey the urine was increased 1000 c.c., the urea 3·27 grammes, and the sugar 65 grammes above this average. On the second day there was a farther increase in the urine of 1252 c.c., in the urea of 9 grammes, and in the sugar of 50 grammes. The average excretion of these two days was 4032 c.c. of urine, 41·91 grammes of urea, and 225 grammes of sugar, as against 2403 c.c., 34·13, and 135, at which it had previously stood; an increase in the urine of 1629 c.c., in the urea of 6·77, and in the sugar of 90 grammes. That this increase was directly dependent upon the consumption of the honey seems to be proved by the fact, that immediately this was discontinued the urine and sugar both suddenly fell to the amount at which they had been excreted on the day before the experiment was made, and the urea also fell below the previous average. We shall also see, by reference to the table, that, although the excretion subsequently increased, and the average of urine, urea, and sugar became higher than it had been before the honey had been given, neither of these rose to anything like the height at which it had stood during the two days upon which the experiment was made, the average for the last six days during which the estimations were made being 3047 c.c. of urine, 40·75 grammes of urea, and 164 grammes of sugar.

The facts which appear to have been proved by this experiment were:

1. That, irrespective of any change of diet, the amount of urine, urea, and sugar excreted in diabetes varies very greatly from day to day.
2. That the excess in either of these constituents does not appear to be accompanied by a decrease in the other.
3. That the addition of honey to the diet causes an

immediate rise in the quantity of urine, urea, and sugar excreted, the rise in all these becoming greater as the honey is continued.

4. That only about half of the sugar given in this form appears to be eliminated by the kidneys in the form of sugar, the remainder being probably burnt off in the lungs or assimilated to the system.

5. That whatever truth there may be in the asserted benefit derived from the dietetic use of honey in diabetes, in this case it certainly did not act beneficially by diminishing the amount of urea; for not only was the amount of urine, urea, and sugar greatly increased during its consumption, but after it was omitted all these remained higher than they had previously been, the increase being especially noticeable in the amount of urea.

The second experiment was made upon an unmarried woman, Martha L., æt. 26, who was known to have been suffering from diabetes during the eight preceding months. This woman had been admitted into the Hospital on February 12, 1870, having at that time lost much flesh and become very weak. She was also complaining of great thirst and dryness of mouth, and had occasionally a voracious appetite; her bowels were rather constipated and her urine abundant, very saccharine, and of a specific gravity of 1046.

She was treated at first with iron, strychnia, and cod-liver oil, and on account of the little sleep she obtained at night, was given two grains of opium, and subsequently half a drachm of hydrate of chloral, every night. Her diet consisted of fish, a mutton chop, greens, two eggs, two ounces of butter, bran bread, four ounces of brandy, and one pint each of beef-tea, soup, and milk daily; but she was allowed neither sugar nor any amylaceous food. Under this treatment she at first improved, felt better, and gained flesh slightly. She was then given for about a week from seven to nine pints of milk daily. This either produced or was followed by diarrhoea, and in consequence was discontinued. After this attack of diarrhoea had been checked, she was given a combination of arsenic and iron, with cod-liver oil, and the same diet as on her first ad-

mission. For some time her symptoms appeared to be stationary, but there was then an evident and continuous diminution of strength and some loss of flesh. Her medicine and diet were then again changed to that which she was taking when the daily estimation of the amount of urine, urea, and sugar passed was first commenced.

The experiments made upon this patient during the time these constituents were estimated were undertaken for the purpose of ascertaining the effects produced upon the amount of urea and sugar excreted by an addition of first honey, and then bread, to her diet. The results are shown in the table on pp. 222, 223, and are commented upon in the following remarks.

The determinations in this case extended over twenty-four consecutive days. Taking the average of the whole of this time, the amount of urine daily passed was 3714 cubic centimetres, and its specific gravity 1040. The percentage of urea was 1·077, and that of sugar 6·93; the absolute amount of these constituents excreted being respectively 41·39 and 271·10 grammes. This, in English weights and measures, would be represented by five and a half pints of urine, containing about 637 grains of urea and eight and three-quarter ounces of sugar. This amount of urea is greatly in excess of the normal quantity; and the sugar is quite sufficient to constitute this a severe and typical case of diabetes. On examining the table given on pp. 222, 223, it will be seen that the amount of urine, urea, and sugar passed varied considerably from day to day, quite independently of any medicine or food which was taken. To such an extent was this the case—especially as regards the amount of urine—that if it were not for the rise in the specific gravity and in the percentage of both the urea and sugar, which is seen to accompany an absolute diminution in the amount of them all, the conclusion would naturally arise, that upon certain days a portion of the urine had not been saved. The facts, however, that, upon the day when the smallest amount of urine was passed, it contained nearly 36 grammes of urea—which, although below the daily average in this case, is considerably in excess of the normal amount—

and that this was accompanied by a specific gravity and a percentage of urea and sugar all in excess of the daily average, are sufficient proofs that the estimations were accurately made. This also is shown by the circumstance, that on other days, when the amounts of urine and sugar were above the daily average, the percentage and absolute amount of urea fell much below it, and indeed below that excreted on the day when the smallest quantity of urine was passed.

These daily variations form, to a certain extent, an obstacle in the way of any attempt to estimate the effects produced by change of diet. Nevertheless, by taking the average of certain days during which a particular diet was given, and comparing this with the average of other days upon which a change was made, we are able very fairly to mark the result, even in the experiment when honey was given, though this was only continued for two consecutive days.

Thus, if we take the average of the first five days during which the urine was estimated, and when no sugar or amylaceous food was given, we shall find that the amounts of urine, urea, and sugar passed were 4159 c.c. of urine, 39·74 grammes of urea, and 319·28 grammes of sugar. It will also be seen that the immediate effect of adding to the diet 248 grammes of honey—which is equivalent to 179·56 grammes of a mixture of grape and fruit-sugar—was to reduce below the average of the previous days not only the urine and urea, but even very considerably the amount of sugar itself; the quantities of these passed on the day following this addition to the diet being 3976 c.c. of urine, 34·98 grammes of urea, and 248 grammes of sugar. On the second day on which the honey was continued a considerable rise certainly did take place in the amount of urine and its constituents; but by taking the average of the two days, we shall find that it varied very little from the average of the previous five days, the amounts being 4260, 39·30, and 313·75, as against 4159, 39·74, and 319·28. These numbers show the somewhat extraordinary fact, that the addition of 359·12 grammes of a mixture of grape and fruit-sugar to the diet in forty-

eight hours was followed by some slight diminution in the amount of sugar excreted in the urine. Continuing our analysis of the table, we see that the urine examined on May 29—which was that passed during the twenty-four hours immediately after all sugar had been again excluded from the diet—contained almost as much sugar as that passed on the previous day. Now, as it may be argued that a portion of this urine passed soon after noon on the 28th might have been affected by the honey eaten with the breakfast of that day, it will obviate all source of error if we add this to the urine of the two previous days, and then take the average. This we shall find to be 4430, 40·51, and 325·50, as against 4159, 39·74, and 319·28, the average of the five previous days.

The only perceptible effect, then, of consuming 359·12 grammes of mixed grape and fruit-sugar was to cause an increased excretion of 713 c.c. of urine, 2·31 grammes of urea, and 18·66 grammes of sugar. From this experiment it seems physiologically evident, that little or none of the additional or introduced sugar appeared in the urine, or if it did, that there was a corresponding diminution in the formation of sugar in the system. Of these two hypotheses the former seems most natural. We are therefore obliged to infer, either that the sugar was oxydised and destroyed immediately it was absorbed, and carried into the blood by the process of digestion; or else that it became assimilated to the body, and had ceased to be sugar when its action commenced.

Forty-eight hours after this patient had ceased to take the honey, and had been again placed upon a diet free from amylaceous and saccharine materials, a considerable reduction took place in the amount of sugar excreted in the urine; and this, with comparatively trifling variations, continued during the next seven days gradually to decrease, until the amount excreted on June 6th was only 169·47 grammes, a reduction of more than one-third the previous average. The amount of urea passed during this time was at first increased—on one day, without any apparent cause, enormously so—then gradually fell, and on June 6th was 35·89 grammes, nearly 6 grammes below previous average.

With a gradually diminishing excretion of both urea and sugar, it was now determined to watch the effect of a small addition of bread to the diet. On June 6th 142 grammes of aerated bread—calculated to be equal to 42 grammes of starch—was added to the diet and continued during the eight following days. The results were: on the first day upon which the bread was eaten the increase in the amount of urea was 6·27 grammes, and in that of the sugar 44·57 grammes, above that of the previous day; on the second day of taking bread the amount of sugar was still farther increased by 60 grammes; and although it fell on the following day, from that time it steadily increased, until it rose on the eighth day, when the experiment was abandoned, to 315·55 grammes, which was very nearly double the amount excreted on the day upon which the addition of bread was made to the diet. Even taking the average of the eight days before the bread was given, and comparing it with the average of the eight days during which bread was eaten, we shall find that there was a daily increased excretion of sugar to the amount of 30 grammes. This was also accompanied by a daily increase of $4\frac{1}{2}$ grammes of urea above the amount to which it had fallen on the two days previous to the first administration of bread.

The effect, therefore, of administering 42 grammes of starch was apparently to convert a case which was daily improving into one which, judging by the amount of sugar and urea excreted, became rapidly and persistently worse. The facts which these experiments seem to prove are the following:

1. That, as was shown by the former case, the amount of urine, urea, and sugar varies greatly from day to day in diabetes, irrespective of any alteration of diet; and that the excess in either the sugar or urea is not compensated by a decrease in the other.

2. That, contrary to that which happened in the former case, a large quantity of honey given during two consecutive days was followed at first by a considerable reduction in the amount of urea and sugar excreted; but that as the honey was continued, an increase in both these constituents

took place, and was almost equally evident in the urine collected during the twenty-four hours immediately following the omission of the honey from the diet. The absolute amount of sugar and urea passed during these three days, however, very slightly exceeded that passed during the three days previous to the honey being given.

3. That twenty-four hours after this consumption of honey had ceased, the amount of sugar excreted began to diminish and become gradually less; and although during the first day some diminution occurred in the amount of urea excreted, this was not permanent, as for two days after the honey was omitted it increased enormously—apparently from some transitory effect produced upon the system. The gradual diminution which afterwards took place in both the amount of urea and sugar seemed to show that this experiment had done no permanent harm.

4. That the effect of a small addition of bread to the diet caused an immediate and considerable increase in the amount of sugar excreted; but that the injurious effect of the bread was not fully established until the second day of its administration, after which it seemed to produce a steady increase in the amount of sugar.

5. That the additional amount of sugar excreted when the bread was taken was greatly in excess of that which could have been formed by the mere chemical conversion of the starch contained in the bread into sugar; and was therefore probably the result of some injurious effect produced by the bread upon the system.

6. That the administration of bread caused an immediate increase in the amount of urea excreted, but that this increase was not, like that of the sugar, progressive, or afterwards very marked.

Finally, honey appeared to produce a favourable effect upon the progress of this woman's disease, bread a decidedly injurious one.

The third series of determinations were made upon the urine of a man named Thomas S., a miner from the Forest of Dean, æt. 25 years, who at the time the experiments were commenced had been under my observation for about a month. Four months before this, he had first

noticed a gradual failure of strength, accompanied by an intolerable thirst, which no amount of drink seemed able to allay. He at the same time passed an enormous quantity of water, and gradually lost flesh. At the end of a month he felt so weak that he was obliged to give up his work, and after being treated for diabetes in the country, was sent to the Hospital and placed under my care. On admission he had lost two stones in weight, and complained of weakness and considerable thirst. His bowels were confined, and his skin somewhat dry and harsh, but his tongue was natural in appearance and his appetite good; he also slept tolerably well. During the first day, being given the ordinary diet of the Hospital, and placed under no restriction as regards amylaceous or saccharine food, he passed 5452 c.c. of urine of a specific gravity of 1037, containing 537 grammes of sugar. After this estimation had been made, he was given *olei morrhue 3ss.*, *liq. chloridi arsenici mx.*, *tinct. ferri perchloridi mx.* *ter die*, with *extract col. co. gr. v.*, *opii gr. j.* *o.n.*; and for diet, six ounces of cooked meat, with greens, one pint of beef-tea, one pint of milk, one ounce of butter, tea, a lemon, and eight ounces of bread, daily; but no other amylaceous food, no beer, and no sugar. He was also allowed to take one hour's walking exercise daily, but upon these occasions was always accompanied and watched. During the first month he somewhat improved in health, and gained some flesh, but had a slight cough, with prolonged expiration under both apices. At this time the daily estimations were commenced, and continued for nearly two months. Whilst these were being made, the four following experiments were performed: 1. He was given a double quantity of bread; 2. All bread was withdrawn from his diet; 3. Honey was added to his diet during two consecutive days; 4. This last experiment was again repeated. During this period he suffered from a slight attack of scarlet fever, and from rather a severe one of diarrhoea. The effects which these experiments and accidents produced upon the amount of urine, urea, and sugar excreted will be found in the table given on pages 219-221. Having noticed the discrepancies which occasionally occurred

between the specific gravity of the urine and the amount of urea and sugar excreted, I made during two weeks daily determinations of the quantity of phosphoric acid passed, with an idea that the amount of phosphates might partly account for this. Although these were made at a time when no bread was taken with the diet, the daily variations were so slight that they led to no result. I did not therefore think it necessary to continue them, or even to add them to the table, especially as they averaged about 5·6 grammes, which is not largely in excess of the normal amount.

After this man had recovered from his attack of scarlet fever and the diarrhoea which followed it, he certainly seemed improved in health, and became less lethargic and more intelligent. It will however be seen, by reference to the table, that although the amount of sugar remained permanently diminished after all bread had been taken from his diet, the excretion of urea continued considerably above the normal standard, and quite as high as when he was eating bread; and this was found to be the case a month afterwards, when he was discharged from the Hospital. Thinking it probable that no permanent improvement had resulted from treatment in this case, and that the amount of sugar would be quite as high if no restrictions were placed on his diet, I sent him to the Convalescent Hospital at Wimbledon for three weeks, with instructions to eat the ordinary diet there, and take as much exercise as he was able. Upon his return he considered himself to be, and certainly looked, in much better health, but had lost weight. He was then made the subject of farther experiments, for the purpose of proving the comparative effects produced by honey, white sugar, and bread, given each separately for a week at a time. The effect of the bread, however, was apparently so injurious, that his health rapidly broke down after he commenced taking it, and he left the Hospital only a few days before his death, which seemed to be hastened by this change of diet. An account of these experiments will be found further on in this paper.

In this case the determinations extended over so long

a period, that it is difficult to make an analysis of them, as has been done in the preceding ones. I shall therefore merely make a few remarks upon the experiments performed, and direct attention to the points in which they correspond with or differ from similar ones previously made and recorded. It will be seen by reference to the table, that the effect of experiment i.—which consisted of giving additional bread with the diet—was to cause on the first day a decrease of urine and sugar and an increase of urea; on the second a large increase of urine, sugar, and urea—the latter of which attained its maximum on this day; and on the third a still greater increase of urine and sugar. After this the urine, urea, and sugar all remained permanently increased as long as the extra bread was continued. The daily amount of extra bread given in this experiment contained 84 grammes of starch; and the patient consequently consumed, in the six days during which it was given, 504 grammes of extra starch. If, now, we calculate the amount of sugar excreted during the six days before this was given, and compare it with that passed in the six during which it was taken, we shall find that in this case the extra sugar was rather less than that which would have been formed by the simple conversion of the starch into sugar; the extra amount of urea excreted at the same time averaging about 6 grammes daily. This experiment differs from a similar one already related as made upon Martha Lyne in two particulars. In the first place, in her case the amount of sugar was immediately increased by the consumption of bread; whereas in this one there was, during the first twenty-four hours, an absolute diminution in its excretion. In the second place, the increased excretion of sugar in Lyne's case was very greatly in excess of that which could have been formed from the mere conversion of the starch; whereas in this it fell rather below it. The cases agreed in showing a very large increase of sugar and a maximum quantity of urea on the second day of giving bread, and also in the increase of sugar and urea remaining permanent so long as this was continued.

The results of experiment ii., by which all bread was

withdrawn from the diet, were probably interfered with by the occurrence of an attack of scarlet fever. It is, however, a singular circumstance, that in the same manner no increase took place in the amount of sugar excreted during the first twenty-four hours after extra bread was given; so, when all bread was withdrawn from the diet, the excretion of sugar during the first twenty-four hours remained unaffected. On the second day, however, the sugar fell lower even than would be accounted for by the non-conversion of the starch contained in the bread, and there was a large excess in the amount of urea excreted, which continued for several days; but how far this latter was dependent upon the attack of scarlatina it is quite impossible to say.

Accident i. (mild scarlatina) caused, or seemed to cause, a diminution in the excretion of sugar, and appeared at its commencement and at the period of desquamation to have caused an increase in the amount of urea excreted. Accident ii. (diarrhoea) caused a very remarkable decrease of sugar, but very slightly diminished the percentage or quantity of urea.

Experiments iii. and iv. were perfectly similar, and consisted in adding 248 grammes of honey, which is equivalent to 179.56 grammes of a mixture of grape and fruit-sugar to the diet. In both a considerable increase of sugar took place on the first day; in both—but especially in experiment iv.—there was a diminution of this increase on the second day; and in both the increase of urine, urea, and sugar remained very high for three days after the honey was discontinued; the daily average of them all in experiment iii. being greater than when the honey was being consumed. In experiment iv. the urine and sugar were slightly less, but the urea considerably increased; and this increase of urea appeared to be permanently established and to continue during the following ten days upon which the amounts of sugar and urea excreted were estimated. In neither of these experiments did the excess of excreted sugar during the time honey was being taken exceed in amount one-half the weight of sugar which had been added to the diet.

These latter experiments were repetitions of those previously made upon the other patients, Jones and Lyne; but in many respects they varied from them in their results. In the case of Jones, the addition of honey to the diet increased the amount of excreted sugar at once; this increase was still greater on the second day; but the amount of sugar fell again at once to its former standard when the honey was omitted from his diet. In the case of Lyne, the amount of sugar was reduced on the first day, increased on the second, and continued almost as great on the day following the omission of the honey from her diet; after which it fell to its former standard. In these two experiments upon Smith, the increase, like that in the case of Jones, took place at once; then, unlike that which took place in the other two cases, there was a diminution of this increase on the second day; and when the honey was omitted, the increased excretion of sugar, instead of continuing only one day, as in Lyne's case, exceeded in one experiment, and nearly equalled in the other, for three days the amount excreted during the time honey was being consumed.

In the effect produced upon the excretion of urea, the similarity between these and the former experiments is much more marked. In the experiment upon Jones, the increase of urea certainly took place at once, was greater on the second day, fell slightly when the honey was omitted, but was afterwards permanently increased. In the three other experiments the urea fell below the previous standard whilst the honey was being consumed, but immediately it was omitted increased excessively, and remained permanently in excess for some days.

The principal additional fact which the experiments in this case seemed to prove was, that the increased excretion of urea following the addition of bread to the diet may be delayed for twenty-four hours; and that when this is omitted from the diet, a similar delay may occur before any diminution takes place in the amount of urea excreted.

The fourth series of experiments were made upon Thomas Jones after his return from Wimbledon. Whilst

in the Convalescent Hospital there, he was placed under no treatment, was allowed the ordinary diet supplied to the inmates of that institution, and took exercise freely in the open air. The results of this were, an apparent improvement of his health, a slight increase in his weight, but a decided exaggeration of sugar excretion. So much was this the case, that on the first day after his readmission the amount of sugar passed amounted to 334.55 grammes in the twenty-four hours, or to nearly three times the quantity he was passing when he left the Hospital five weeks previously.

For three days after his readmission he was allowed twelve ounces of bread daily, but no other amylaceous food, no saccharine matter, and no beer. Even under this diet the amount of sugar was rapidly diminishing, when for the next three days he was entirely deprived of all amylaceous food, and then made the subject of experiment. During this his second residence in the Hospital he received no treatment beyond being strictly dieted in the intervals of the experiments. He, however, improved very much in health, and increased steadily in weight, during the whole time, gaining about one pound each week. The time he complained of feeling most unwell was when for a few days he was taking bread; and although after this the amount of sugar in the urine never again fell so low as it had previously been, the average amount of it for several days before he finally left the Hospital was about one-half of that he was passing when previously discharged, and less than a fifth the amount he passed the day following his return from Wimbledon.

The experiments were three in number, and were made with a view of ascertaining the relative influence of equal weights of honey, bread, and white sugar upon the amount of urea and sugar excreted, and the amount of each of these materials given was eight ounces. It was originally intended to give each of them for a week in succession, and to allow a week to elapse between each experiment, in the hope that by so doing the urine during this interval would return to its previous standard, and lose all trace of the disturbance to its composition caused by the pre-

ceding experiment. This plan, however, was not strictly adhered to, and the bread was only continued for four days. The man almost immediately he took it complained of the distressing thirst it caused him; and on this account, and because it inconveniently increased the amount of urine he was passing, he, unlike diabetics in general, was very unwilling to take it. It was therefore thought advisable not to continue this experiment; partly from a conviction that the bread was really doing him harm, and also from a fear that he might employ deceit and not eat it, though professing to do so, and thus destroy the value of the experiment.

The results of these experiments are given in a tabulated form on pp. 224, 225.

On comparing this table of determinations with the one previously given of the urine of the same man, the great diminution in the weight of urea daily excreted is very remarkable. This diminution amounted to between one-third and one-half of the amount previously passed, and can only be accounted for that the man was given less diet, and that his disease was progressing favourably. How far these causes respectively contributed to the result I have no means of showing, and merely allude to the circumstance as one which may be worth farther investigation.

In endeavouring to draw any conclusions from this series of experiments, the first difficulty which meets us in this as in every case is, the variations in the amount of sugar which occur from day to day quite independently of any alteration of diet; a variation which, to a lesser extent, affects also the amount of urea excreted. By taking, however, the average of several days it is possible to arrive at certain conclusions, which may be accepted as fairly representing the effects produced by adding to the diet a given amount of either of the materials with which the experiments were made.

If, then, we examine first the effect produced upon the amount of sugar excreted, we shall find, that during the eight days upon which he consumed, in addition to his other diet, 284 grammes of honey, the daily average

amount of sugar passed was 134·54 grammes, and that the daily average of the next nine days, during which no honey was eaten, was 43·73 grammes, a difference of 90·81 grammes. As the honey contained 179·56 grammes of a mixture of fruit and grape-sugar, the conclusion is, that about half the amount of sugar taken in the form of honey was either burnt off in the lungs or assimilated to the system. If next we examine the effect which this honey had upon the excretion of urea, we shall find it to have been so slight as to have no value. Unfortunately, the earlier determinations of urea were lost; but the average daily amount excreted during the last five days upon which the man took honey amounted to 17·29 grammes. During the nine following days upon which the honey was omitted the average was 18·88 grammes, an increase of 1·59 grammes only. After this man had been strictly dieted for nine days, during which the average of sugar and urea passed were respectively 43·73 and 18·88 grammes, he was given for four days consecutively 284 grammes of bread. The effect of this was to raise the daily average of sugar to 111·27 grammes, and that of the urea to 24·44 grammes; or to cause an increase of 67·44 grammes of the former, and 5·56 grammes of the latter. As this bread was estimated to contain 84 grammes of starch, the inference is, that the greater bulk of it must have been converted into sugar, and in this form eliminated in the urine; or else that by its presence it so increased the glycogenic tendency in the system, as to give rise to an extra formation of sugar almost equal to its own weight. This starch also seemed to considerably increase the amount of urea excreted. This excretion of urea appeared to be still more increased after the bread was omitted; and, as if indicating that some permanent disturbance had been caused to the system, the sugar during the next twelve days, during which no amylaceous or saccharine food was given, never again fell to its former standard. During these twelve days the average daily amounts of sugar and urea excreted were 71·81 and 26·31 grammes; an increase of 28·12 grammes of sugar and 7·43 grammes of urea above that which was being passed

before the system had been disturbed by the addition of bread to the diet.

With an average daily excretion of 71·81 grammes of sugar and 26·31 grammes of urea, the third experiment was commenced. This consisted of giving for six days in succession 284 grammes of white sugar. The effect of this was very extraordinary, and certainly very unexpected; for it only increased the daily average excretion of sugar to 118·35 grammes, and reduced the excretion of urea to 20·37 grammes. It would appear, then, that of this 284 grammes of pure sugar, 237·46 grammes were either burnt off in the lungs or assimilated to the system, and that at the same time a reduction in the amount of urea excreted took place.

As a proof that this sugar did no subsequent harm, we have the fact that the average daily excretion of sugar during the six days following its omission from the diet fell below the amount at which it had stood before this sugar was given, and appeared disposed to fall still lower when the determinations which had been continued for fifty-one consecutive days were discontinued.

The fifth and last series of experiments was made upon Thomas S. after his return from Wimbledon. He also whilst there was placed under no restrictions as regards diet, was allowed to spend the greater portion of the day in the open air, and received no medical treatment.

When readmitted into the Hospital he was much more healthy in appearance, but had lost some pounds in weight; and on the first two days, during which he was allowed the ordinary diet, which included twelve ounces of bread, passed 386·88 grammes of sugar, which was about 100 grammes more than he was passing when previously in the Hospital, and deprived of all saccharine and amylaceous food. After having been dieted for a few days, this man was subjected to the same experiments as those already related as having been made upon Thomas Jones. In his case, however, some of the results are not so satisfactory, as they were interfered with by the occurrence of a slight attack of diarrhoea, and by the man's increased

illness and loss of appetite at the time he was experimentally given bread. During his residence in the Hospital he was ordered no treatment specially directed against his diabetic condition, but was treated for the diarrhoea, from which he suffered for a day or two. He appeared to get rapidly worse when given bread with his diet, but this may have been a mere coincidence. He showed no evidence of any increased tubercular deposit having taken place in his lungs; and his death, which occurred a few days after he left the Hospital, appeared to result from rapidly-increasing debility caused by his inability to take food; it was also probably hastened by his confinement to the Hospital, and by his being deprived of the exercise he had been in the habit of taking in the open air.

These experiments, like the former, are given in a tabulated form on pp. 226, 227.

On looking through this table, the first fact worthy of notice is, that scarcely any diminution of sugar-excretion occurred during the first twenty-four hours following the total withdrawal of all amylaceous and saccharine materials from the diet, and that very little increase of it occurred from the addition of honey to it, either at once or when this was continued, as it was, for some days. Similar circumstances had been noticed during the experiments formerly made upon this man; for both when additional bread was given him, and when this was afterwards withdrawn, no change in the amount of excreted sugar took place during the first twenty-four hours. If we calculate the daily average of sugar passed by this man during the week he was taking for two days 142 and for five days 284 grammes of honey, we shall find that it varied so little from that which was afterwards excreted when the honey was no longer taken, that we can only conclude that this latter had in this case little or no influence over the excretion of sugar, the amounts being respectively 195·61 and 184·01 grammes.

Even the addition of 284 grammes of white sugar, which was continued for the next five days, appears to have had but little influence in increasing the amount of sugar, though it slightly diminished the amount of urea

excreted, the average increase of sugar being only 45·47 grammes, and the diminution of urea 2·58 grammes. Thus in a case of confirmed diabetes in so advanced a stage that the man died within a month of the experiment, we have the somewhat extraordinary fact, that the addition for five days of 284 grammes of pure white sugar to the diet only caused an increase of 45·49 grammes in the amount of sugar excreted with the urine.

After the white sugar was withdrawn from this man's diet the amount of excreted sugar diminished gradually but slightly for three days. Diarrhoea then occurred, and this was followed for some days by a much diminished excretion of sugar. At this period the experiment was made of giving 284 grammes of bread with the diet. This caused an immediate and large increase of sugar-excretion, which continued the next three days, and was also accompanied by an excess in the excretion of urea. Directly he commenced this diet his appetite failed, he lost flesh rapidly, began to feel weak and exhausted, and was evidently rapidly sinking when his friends removed him from the Hospital. During the time he remained under observation determinations were still regularly made of the amount of sugar and urea passed, the latter of which was much increased in quantity. These may be seen by reference to the table, but I have not attempted to draw any conclusions from them. At the time it was thought that this man's death was hastened by the administration of bread, and that until this was given there was no reason for supposing that the case was progressing unfavourably. Whether this was the real cause of his rapid change for the worse it is of course impossible to say; but this, and all the other experiments in which bread was given, certainly impressed me strongly with an idea of its injurious influence in cases of diabetes.

I can only regard the results of these experiments as affording us so many unconnected facts from which it would be hazardous to draw any positive conclusions; and I am quite prepared to see many of them reversed by a repetition of the same experiments upon other individuals. It is, then, without any wish of attaching to them greater

importance than they merit, that I offer them as a contribution towards our knowledge of the dietetic treatment of diabetes.

If they prove anything, these experiments certainly seem to show that the amount of sugar excreted in the urine is far larger after the consumption of a given weight of bread than it would be after the same amount of honey, and after this latter than after pure white sugar.

Whenever bread was eaten, it always gave rise to a large increase in the amount of excreted sugar; and in one case, or it may be at one stage of the disease, this increase was absolutely in excess of that which could have arisen from the mere conversion of the starch contained in the bread into sugar. In some experiments this sugar-formation was delayed for twenty-four hours after the bread was eaten; and when this was removed from the diet, a similar interval elapsed before, by diminished excretion of sugar, the system gave evidence of its having been relieved from the effect produced upon it by the bread; though in similar experiments repeated upon the same individual this result was not constant. The addition of bread to the diet seemed also invariably to increase the amount of urea excreted.

In no instance when honey was given did it lead to a greater excess in the sugar-excretion than would represent one-half the weight of the sugar given in the form of honey. In two experiments it was even difficult to detect any very conclusive evidence of the excreted sugar having been increased by the addition of honey to the diet. In other instances in which an increased excretion had taken place this seemed to continue to quite as great an extent for two or three days after the honey had been entirely omitted from the diet. In some instances, honey appeared to increase the amount of urea excreted; but more generally it diminished this slightly so long as it was continued in the diet. Whenever honey was given and then omitted, an excess in the excretion of urea followed, or continued with oscillations, for several days. This had the appearance of being the normal excretion, which, having been checked by the presence of the honey,

made its appearance in the urine immediately the honey was withdrawn from the diet. The most unexpected results, however, were those which followed the addition of sugar in large quantities to the diet. These results were similar in both instances in which the experiment was made, though one was made on a comparatively slight case progressing favourably, and the other upon a severe case rapidly tending towards a fatal termination.

In the first case, the addition of 284 grammes of white sugar to the diet raised the amount of excreted sugar 46·54 grammes, and diminished the urea 5·94 grammes. In the second case, the same weight of sugar raised the amount of excreted sugar 45·47 grammes, and diminished the excretion of urea 2·58 grammes. One of these experiments was continued for six and in the other for five days; and in the former, when sugar was no longer given in the diet, an increased excretion of urea took place, and was still rising when the determination was omitted, on account of the mercury solution being exhausted.

The practical conclusions which the facts above related, if subsequently verified, would seem to justify are:

1. That in all cases and in every stage of diabetes, bread, and probably all other amylaceous food, should be strictly excluded from the diet; for if given, it will largely increase the amount of urine, urea, and sugar excreted, and in every way aggravate the symptoms of the disease. It is however probable that its injurious effect is less felt by an individual who is at the same time taking exercise and much in the open air.

2. That honey may often be advantageously used as an article of diet, because in some cases, or possibly in some stages, of diabetes a large amount of it may be eaten without materially increasing the weight of urea or sugar excreted; and because, although in other cases an increase of the sugar may occur, this is accompanied by a diminished excretion of urea, and is often very much less in amount than would be represented by the sugar consumed in the form of honey.

3. That pure white sugar may be added to the diet in diabetes with every prospect of a beneficial result; for

its use is accompanied by a diminution in the amount of urea excreted, and when given in large quantities, less than one-sixth of the amount escapes as sugar in the urine, the remainder being either burnt off or otherwise appropriated to the uses of the system.

As regards the various theories respecting the nature of diabetes, these experiments seem to prove, that it does not at any stage depend either upon a simple arrest at the stage of sugar in the chemical changes which starch undergoes in the system, or upon sugar as it passes through the body escaping those chemical transformations by which, in health, it is converted first into vegetable acid and then into carbonic acid and water.

The facts that an interval of twenty-four hours may sometimes elapse before any increased excretion of sugar follows the increased consumption of starch, and that this may at other times give rise to an increased excretion in excess of that which would represent the conversion of the starch into sugar, and especially that a very large amount of pure sugar may be taken in the diet of which only a very small proportion subsequently appears in the urine, are all circumstances which seem to make it far more probable that the disease depends upon some derangement of the liver, leading to an excessive secretion of sugar by that organ. Upon this theory we can explain the injurious effects of starch, by supposing it to act in some manner directly upon the liver, and are able at the same time to understand why both honey and sugar are always less injurious, or even positively beneficial, when contained in the diet of those suffering from diabetes.

In conclusion, I am anxious to acknowledge the assistance I have received from my house physician Dr. Laking, and my clinical clerk Mr. Ewart. Both of them made for me many of the determinations from which the tables accompanying this paper have been calculated and compiled. Dr. Laking, in addition, most carefully superintended the carrying out of the various experiments, and took every precaution to secure their being honestly performed. Without such assistance, and without constant supervision and watching, it would have been impossible

for me to have attempted them. This will be well understood by those who have made similar experiments ; for they will be aware how difficult it is to secure accuracy even in collecting the daily amount of urine passed, and how the carelessness, ignorance, and often love of deceit which the patients themselves exhibit, increase the difficulties attending investigations of this nature.

Determinations of Urea and Sugar in the Urine of Thomas S.

Date.	Amount of urine in cu- bic centis.	Specific gra- vity.	Percentage of urea.	Percentage of sugar.	Weight of urea in grammes.	Weight of sugar in grammes.	Treatment.	Diet.	Remarks.
April 4	4004	1086	1.11	8.61	44.44	345	Oil morrhue $\frac{3}{4}$ liq. arsenic chloridi Mx., tinct. ferri perch. Mx., aquae $\frac{3}{4}$ liq. ter die, opii gr. j. extr. coloc. co. g. v. o.n.	Mutton-chop, greens, 1 pint of beef-tea, 2 pints of milk, 2 oz. of butter, 8 oz. of bread; tea.	April 5-7. Steady increase in sugar with slight varia- tions in the amount of urea unaccounted for. April 7. Opium omitted, as it confines the bowels. April 9-12. Decrease in sugar, which is still high; steady decrease in urea. April 10. No estimation made.
10	—	—	—	—	—	—	April 9. Jalapini gr. j., turmeric gr. j., extr. aloes squos gr. j., saponis gr. j., p.r.n.	8 oz. additional bread.	<i>Experiment I.</i> April 14. Sugar diminished, urea increased. April 15. Urine, urea, and sugar greatly increased. April 16. Urine and sugar still more increased; slight fall in urea. April 18. Permanent increase in urine, urea, and sugar.
11	3771	1084	0.88	9.25	38.91	349			<i>Experiment II.</i> April 20. No effect from with- drawal of bread.
12	4260	1087	0.75	7.91	38.42	338			
13	4487	1084	0.77	8.29	34.54	372			
14	3976	1033	1.03	8.00	41.35	318			
15	5680	1033	0.93	7.97	52.87	452			
16	6191	1084	0.75	8.77	46.43	543.4			
17	5056	1086	0.92	8.25	41.76	468			
18	5112	1085	0.78	7.46	40.88	331.5			
19	5112	1084	0.70	8.77	38.78	448.4			
20	5396	1033	0.76	8.06	41.00	435	Haut. potass. cit. ef- fer. $\frac{3}{4}$ liq. i. potass. bicarb. gr. x.4 horis.	All bread withdrawn. 5 bran biscuits.	

Date.	Amount of urea in cubic cents.	Specific gravity.	Percentage of urea.	Percentage of sugar.	Weight of urea in grammes.	Weight of sugar in grammes.	Treatment.	Diet.	Remarks.
April 21	3408	1084	1.60	7.97	52.28	261.8	Haust. amm. cit. ʒi, ammon. carb. gr. v., ferri ammon. cit. gr. v. 6 horis.	Continued the same diet during the attack of scarlet fever.	April 21. Considerable diminution of urine and sugar; large increase of urea. <i>Accident I.</i> April 22. Patient attacked with slight scarlet fever. April 25. Sugar and urea both fall under influence of scarlet fever; but exacerbation of urea-excretion takes place about the period of desquamation. April 28. No estimation made. April 29. Skin desquamating. May 1. No estimation made. <i>Accident II.</i> May 2. Diarrhoea sets in, producing great decrease in both sugar and urea. <i>Experiment III.</i> May 10. Considerable increase in the amount of sugar; diminution of urea.
22	4089	1082	1.21	7.48	49.51	306			
23	4828	1082	0.94	7.04	45.38	340			
24	4038	1082	1.21	6.00	48.86	243			
25	2953	1082	1.26	6.40	36.02	189			
26	2896	1088	1.22	6.52	35.34	131			
27	3095	1085	0.96	4.78	29.71	148			
28	4089	1038	1.25	—	51.12	—			
29	3976	1084	1.24	3.13	49.30	124			
30	4544	1085	1.16	4.53	52.75	206			
May 1	—	—	—	—	—	—	May 9. 8 oz. of honey added to diet. May 10. Do.		
2	3408	1040	1.11	2.70	36.10	94.60			
3	3521	1088	—	—	—	—			
4	4260	1086	1.03	3.89	44.30	166			
5	3692	1086	1.10	—	40.61	—			
6	4714	1040	0.98	7.14	44.78	336			
7	3692	1038	1.03	5.55	38.37	205			
8	3521	1036	0.80	5.42	29.92	191			
9	3919	1084	1.18	4.97	46.24	195			
10	3976	1038	0.80	6.91	31.80	275			

11	3521	1038	1.10	7.66	38.78	270.
12	3976	1038	1.10	7.69	48.73	305.
13	4089	1038	1.09	7.80	44.16	319.
14	3408	1040	1.17	8.59	40.89	293.
15	3408	1034	1.09	6.94	37.48	236.6
16	3124	1036	1.20	7.68	38.73	240.
17	2953	1040	1.29	7.99	38.38	236.
18	3521	1036	1.24	7.66	43.66	270.
19	2726	1041	1.74	8.76	47.63	289.
20	4089	1038	1.01	8.31	41.70	340.
21	3408	1040	0.92	8.74	31.35	298.
22	3635	1036	1.71	8.05	52.70	293.
23	3846	1038	1.20	8.32	46.15	320.
24	3408	1037	1.28	8.18	42.25	279.
25	3408	1036	1.20	7.45	40.89	254.
26	3067	1036	1.12	7.88	35.57	242.
27	3408	1036	1.27	7.12	43.62	243.
28	3748	1037	1.40	7.09	52.47	276.
29	3846	1038	1.20	7.69	46.15	296.
30	3408	1035	1.40	7.04	47.71	250.
31	3692	1034	0.99	7.93	36.82	293.

Honey omitted from diet.

8 oz. of honey added to diet.
May 20. Do.
May 21. Honey omitted.

May 11. Do. Urea still lower than previous standard.
May 12. Both sugar and urea more increased than when honey was being taken.
May 13. Still greater increase of both.
May 14. Sugar and urea begin to diminish.
Experiment IV.
May 20. Large increase of sugar; diminution of urea.
May 21. Increase of sugar only half so much as yesterday; great diminution of urea.
May 22. Increase in sugar continues; urea very greatly increased.
May 23. Still greater increase of sugar; urea very high.
May 24. Urea and sugar begin to fall and gradually reach their previous standard.
May 26. Fivedays after honey is omitted.
May 27-31. Rather considerable variation in amount of urea and sugar independent of any change of diet.

Determinations of Urea and Sugar in the Urine of Martha Lyne.

Date.	Volume of urine in cubic cent.	Specific gravity of urine.	Percentage of urea.	Percentage of sugar.	Amount of urea in grammes.	Amount of sugar in grammes.	Treatment.	Diet.	Remarks.
May 23	4089	1042	1.01	8.66	41.29	354.21	Liq. strychnis ℥ij., acid. citric. gr. xv., spt. chlorof. 3j., aquæ 3ij., o. sodæ bicarb. gr. xx., 4tis horis, pil. rhel co.	2 pints of beef-tea, 4 eggs, fish, greens, watercresses, 2 oz. butter, bran bread, and half pint of claret.	May 22-6. The amount of urine, urea, and sugar varies considerably from day to day, though the diet and medicine remain unchanged.
28	3976	1042	1.09	8.32	43.73	331.03			<i>Experiment 1.</i>
24	3408	1042	0.98	7.69	38.49	262.16			May 27. Reduction in amount of urea and sugar following the consumption of honey.
25	4771	1042	0.86	7.83	41.13	350.00			May 28. Aphous condition of mouth; rise in the amount of urea and sugar following continued consumption of honey.
26	4544	1038	0.74	6.57	39.07	299.00			May 29. Rise in urea and sugar continues, though honey has been omitted.
27	3976	1040	0.80	6.23	34.98	248.05			May 30. Sugar falls; great increase of urea, without any evident cause.
28	4544	1042	0.96	8.33	43.62	378.66	Potass. chloratis 3j., liq. strychnis ℥vij., aquæ 3j.℥, ter die.	May 26. Do. and half pound of honey.	May 31. Still greater increase in urea.
29	4771	1040	0.98	7.38	43.44	350.00		8 oz. of brandy in two of claret.	June 1-6. Gradual reduction taking place in the amount of sugar.
30	3976	1041	1.27	6.40	50.89	254.68			
31	5225	1038	1.18	5.54	62.70	290.00			
June 1	3976	1040	0.96	6.79	38.16	270.27			
2	3919	1034	1.10	5.55	43.10	217.66			
3	3464	1038	1.22	6.17	42.26	218.82			
4	3805	1040	1.33	6.24	50.98	237.81			
5	2896	1038	1.27	6.41	37.06	185.64			
6	2272	1042	1.58	7.46	35.89	169.43			
7	2840	1044	1.51	7.18	43.16	204.00			

					June 6. Do., and 4		Experiment II.	
					os. of bread.		June 7. Amount of urea and sugar both increased from addition of bread to the diet.	
8	3862	1040	1:10	6:32	44:57	264:52	Do.	June 8. Very large extra increase of sugar.
9	3805	1040	0:92	5:31	35:00	202:40	Do.	June 9. Both sugar and urea less, without any cause.
10	3408	1042	1:11	6:34	36:35	233:42	Do.	June 10-14. Sugar and urea again increased.
11	3635	1042	1:17	7:35	42:39	267:20	Do.	
12	4089	1038	0:84	6:43	34:34	314:56	Do.	
13	3919	1040	0:87	7:48	34:48	292:38	Do.	
14	3976	1042	0:98	8:06	36:76	315:55	Do.	

Determinations of Urea and Sugar in the Urine of Thomas Jones after his return from Wimbledon.

Date.	Amount in cub. centis.	Specific gravity.	Percent- age of urea.	Percent- age of sugar.	Weight of urea in grammes.	Weight of sugar in grammes.	Diet.	Remarks.
Aug. 5	4884	1038	—	6.91		334.55	Ordinary diet, including 12 oz. of bread; no beer, sugar, potatoes, or gruel.	Amount of sugar rapidly falling, though taking bread.
6	3692	1031	—	6.48		249.46		
7	2612	1034	—	6.79		177.68	Aug. 7. 8 oz. of cooked meat, with greens; 1 pint of beef-tea, $\frac{1}{2}$ pint of milk, tea, 2 oz. of butter, 8 bran biscuits, 2 oz. of brandy; no sugar or amylaceous food.	Aug. 8. Great decrease of sugar following withdrawal of bread from diet. <i>Experiment I.</i>
9	1647	1028	—	4.16		64.89		Aug. 10. Sugar rising again.
10	2215	1028	—	4.19		93.84		Aug. 11. Very slight increase of sugar from addition of honey to diet.
11	2120	1030	—	5.19		110.41		Aug. 12 to 18. Continued, but not large, increase of sugar.
12	3350	1030	—	5.10		171.13		
13	2372	1030	—	5.05		114.74		
14	2044	1032	0.7	5.61	14.80	126.14		
15	2896	1031	0.68	6.25	18.02	181.00	Aug. 10 to 17. Do., with 8 oz. of honey.	
16	2315	1030	0.8	5.28	17.72	117.00	Do.	
17	2385	1034	0.8	5.19	19.31	124.00	Do., honey omitted.	
18	2166	1035	0.79	6.08	17.11	132.00	Do.	Immediate large fall in the amount of sugar following omission of honey.
19	1106	1032	1.18	5.21	13.16	57.63	Do.	
20	2499	1025	1.12	3.20	28.23	80.00	Do.	Aug. 20. Sugar rises again.
21	1363	1033	1.49	5.00	20.44	68.15	Do.	Aug. 21 to 27. Sugar continues to diminish.
22	895	1027	1.49	5.00	13.42	44.75	Do.	
23	1306	1023	1.11	3.23	15.54	43.00	Do.	
24	1192	1019	1.10	1.38	13.11	16.46	Do.	<i>Experiment II.</i>
25	1306	1025	1.59	2.06	20.89	27.00	Do.	Aug. 28. Immediate and very large increase in the amount of sugar following addition of bread to the diet.
26	1476	1024	1.65	1.81	24.37	26.80	Do., with 8 oz. of bread.	Increase in sugar slightly less.
27	1192	1028	1.81	2.50	21.79	29.80	Do.	Sugar still farther increased.
28	2215	1030	1.13	4.80	25.25	106.49	Do.	Do.
29	1874	1032	1.18	5.10	21.23	95.62	Do.	
30	2101	1032	1.06	5.63	22.48	117.22	Do.	
31	2215	1032	1.30	5.67	23.80	125.75	Do., bread omitted.	

Sept.	1	1590	1032	1·64	4·46	26·23	70·99	do.	do.	Immediate and great fall in the amount of sugar following the omission of bread.
2	1988	1031	1·34	5·10	26·83	101·42	do.	do.	do.	Sept. 2. Increase of sugar without cause.
3	1476	1090	1·55	4·07	23·02	59·59	do.	do.	do.	Sept. 3. Sugar again falls.
4	1874	1030	1·64	3·51	30·92	66·92	do.	do.	do.	Sept. 4, 5. Considerable increase in urea unaccounted for.
5	2272	1029	1·41	3·73	32·26	84·77	do.	do.	do.	Sept. 6 to 12. Sugar and urea again both fall, but are higher than before bread was given.
6	1533	1028	1·32	3·57	20·23	54·78	do.	do.	do.	
7	1789	1032	1·34	4·31	24·15	77·11	do.	do.	do.	
8	1874	1025	1·33	3·01	24·73	56·52	do.	do.	do.	
9	1523	1030	1·54	3·82	28·60	58·28	do.	do.	do.	
10	2044	1030	1·41	3·67	29·63	75·14	do.	do.	do.	
11	1874	1030	1·39	3·90	26·23	73·20	do.	do.	do.	
12	1931	1028	1·43	4·40	27·99	85·00	do., with 8 oz. of white sugar.	do.	do.	
13	2499	1033	1·07	5·42	26·97	135·67	do.	do.	do.	<i>Experiment III.</i>
14	2215	1030	0·91	3·97	20·27	88·14	do.	do.	do.	Sept. 13. Increase of sugar from addition of sugar to the diet.
15	2272	1033	0·79	5·28	17·94	120·00	do.	do.	do.	Sept. 14. Sugar falls to its previous standard.
16	2215	1032	0·83	5·10	18·60	118·00	do.	do.	do.	Sept. 15 to 18. Sugar rises, but urea falls, under use of sugar in the diet.
17	2499	1032	0·83	5·43	20·99	135·82	do.	do.	do.	Sept. 19. Sugar falls and urea rises upon omission of sugar from diet.
18	1988	1033	0·87	5·95	17·47	118·33	do., sugar omitted.	do.	do.	
19	2044	1032	1·33	4·23	27·38	86·60	do.	do.	do.	
20	1420	1032	1·60	3·93	22·72	56·86	do.	do.	do.	
21	2180	1029	1·63	3·01	84·93	64·21	do.	do.	do.	
22	2042	1025	Not esti-	3·42	Not esti-	70·00	do.	do.	do.	
23	1704	1032	esti-	4·54	77·45	do.	do.	do.	do.	
24	1126	1030	mated.	3·16	35·63	mated.	do.	do.	do.	

Determinations of Urea and Sugar in the Urine of Thomas Smith after his return from Wimbledon.

Date.	Amount in cub. centa.	Specific gravity.	Percent- age of urea.	Percent- age of sugar.	Weight of urea in grammes.	Weight of sugar in grammes.	Diet.	Remarks.
July 29	4489	1040	—	8.68	389.77	384.00	July 30. 3 oz. of cooked meat, with greens; 1 pint of beef-tea; half-pint of milk-tea; 2 oz. of butter, and 8 bran biscuits; 2 oz. of brandy; no sugar or amylaceous food.	On July 28th and 29th was allowed the diet of the Hospital, containing 12 oz. of bread.
30	4544	1039	—	8.44	378.66	378.66	July 31. No diminution of sugar caused by omission of amylaceous food.	July 31. No diminution of sugar caused by omission of amylaceous food.
31	4544	1044	—	8.33	117.24	117.24	Aug. 1. Great diminution of sugar on second day.	Aug. 1. Great diminution of sugar on second day.
Aug. 2	1452	1043	—	8.00	162.28	162.28	Aug. 3. Considerable increase of sugar from previous diminution.	Aug. 3. Considerable increase of sugar from previous diminution.
3	2372	1040	—	7.09	168.29	168.29	Aug. 4. 5. Increase of sugar continues.	Aug. 4. 5. Increase of sugar continues.
4	2385	1042	—	6.80	178.79	178.79	Aug. 6. But is very little influenced by the honey eaten.	Aug. 6. But is very little influenced by the honey eaten.
5	2726	1041	—	6.55	186.57	186.57	Aug. 8. Very slight increase of sugar from addition of honey to the diet.	Aug. 8. Very slight increase of sugar from addition of honey to the diet.
6	2612	1042	—	7.73	181.32	181.32	Aug. 9. Was visited by a friend, and suspected of obtaining some cakes.	Aug. 9. Was visited by a friend, and suspected of obtaining some cakes.
7	2357	1042	—	8.43	191.52	191.52	Aug. 11. Yesterday's $\frac{1}{4}$ lb. of honey was finished at 10 A.M. this morning, when the urine was measured.	Aug. 11. Yesterday's $\frac{1}{4}$ lb. of honey was finished at 10 A.M. this morning, when the urine was measured.
8	2372	1044	—	8.27	171.55	171.55	He was then seen to eat another $\frac{1}{4}$ lb. before 10 P.M. The urine of the 12th, therefore, probably contained the sugar derived from more than one $\frac{1}{4}$ lb. of honey.	He was then seen to eat another $\frac{1}{4}$ lb. before 10 P.M. The urine of the 12th, therefore, probably contained the sugar derived from more than one $\frac{1}{4}$ lb. of honey.
9	2073	1043	—	7.04	200.00	200.00	Do., and 8 oz. of honey.	Do., and 8 oz. of honey.
10	2840	1040	—	7.69	162.77	162.77	Do.	Do.
11	2115	1046	—	8.45	276.59	276.59	Do., honey omitted.	Do., honey omitted.
12	3266	1044	—	7.80	155.32	155.32	Do.	Do.
13	1988	1044	—	8.19	195.41	195.41	Do.	Do.
14	2385	1045	1.1	8.06	229.00	229.00	Do.	Do.
15	2840	1043	1.15	7.70	171.69	171.69	Do.	Do.
16	2272	1040	1.1	8.05	202.12	202.12	Do.	Do.
17	2386	1040	1.0	8.10	197.12	197.12	Do.	Do.
18	2442	1042	1.1	7.87	137.65	137.65	Do.	Do.
19	1817	1045	1.2	8.33	241.83	241.83	Do., with 8 oz. white sugar.	Do., with 8 oz. white sugar.
20	2896	1042	0.84	9.65	240.28	240.28	Do.	Do.
21	2499	1045	0.95	9.65	23.94	23.94	Do.	Do.

23	2272	1047	1.05	9.60	24.94	218.33	Do.	Aug. 20. Immediate large increase of sugar from sugar eaten; urea unaffected.
23	2556	1045	1.09	9.25	27.75	234.63	Do.	
24	2044	1048	1.1	10.00	22.89	212.91	Do., sugar omitted.	Aug. 21. Increase continues.
25	2044	1046	1.1	9.99	23.56	204.40	Do.	Aug. 22, 23, 24. Sugar gradually falls as its use is continued.
26	2101	1048	1.1	9.53	28.32	200.40	Do.	Aug. 25. Very slight diminution of sugar following its omission from the diet.
27	1874	1048	1.3	9.60	25.48	180.40	Do.	
28	1863	1047	1.8	10.10	25.35	155.36	Do.	
29	828	1050	2.1	7.59	17.85	61.51	Do.	
30	1249	1048	2.1	7.81	26.72	97.57	Do.	
31	986	1048	2.4	9.25	22.36	86.61	Do., with 8 oz. of bread.	Aug. 28. Had slight diarrhoea, but did not pass much urine with his motions.
Sept. 1	2044	1045	1.3	9.97	28.60	204.61	Do.	Sept. 1. Large increase of sugar following addition of bread to the diet.
2	2499	1044	1.2	9.25	29.98	231.38	Do.	Sept. 3. Does not feel so well; has pain in the stomach, and has lost 7 lb. in weight during the last five days.
3	2499	1046	1.3	9.98	33.73	249.83	Do.	Sept. 6. Lost his appetite yesterday, and did not eat all his bread.
4	1981	1048	1.5	8.23	29.93	160.10	Do.	Sept. 8. During the last two days has eaten very little; complains of pain in the epigastrium, and is getting very weak.
5	2101	1045	1.5	7.57	31.93	159.16	Do.	Sept. 11. Is still weaker, and will leave the Hospital to-morrow.
6	2215	1045	1.9	7.13	43.07	159.14	Do.	
7	1590	1044	2.6	5.93	37.36	94.64	Do.	
8	1647	1043	2.0	6.00	34.42	100.40	Do.	
9	1590	1040	2.2	6.09	35.77	96.95	Do.	
10	1717	1040	1.7	6.24	29.53	107.30	Do.	
11	1981	1040	1.4	6.6	28.77	138.00	Do.	

W. WADHAM, M.D.

XIV. ON THE RECENT OUTBREAK OF SMALL- POX AT ST. GEORGE'S HOSPITAL.

It is difficult to imagine a more favourable opportunity than the one recently afforded us here, of investigating the laws of an epidemic disease such as the one we have just experienced. I shall therefore, in the first place, state briefly the cases in the order of their occurrence, and then draw from them whatever inferences they may seem to bear.

CASE I. Sarah M., æt. 25, admitted into Holland Ward on September 28th, for syphilitic laryngitis. She took ten-grain doses of iodide of potassium from the 3d of October to the 25th of November. After feverishness, headache, and sickness of two or three days' duration, smallpox eruption appeared on the 25th of November. This at first was thought to be due to the iodide of potassium that she was taking. On the following day, as soon as it was decided that she was suffering from smallpox, she was removed to a separate room downstairs, in the basement of the south wing, whence she was removed into the workhouse on the 1st of December. From the time the eruption was noticed, every care was taken to disinfect her bed-linen, bedding, &c.

CASE II. Sarah C., æt. 25, admitted into Drummond Ward on July 29th, suffering from diseased knee. Eruption of smallpox appeared on the 14th of December. The eruption was semi-confluent. Has made a good recovery. Was vaccinated in infancy; vaccine marks of indifferent quality.

CASE III. Elizabeth H., æt. 23, was admitted October the 15th, for strumous ophthalmia, into the Cholmondeley Ward. Was attacked on November 16th with scarlet-fever, followed by albuminuria. Was brought down to the *Holland Ward*, and placed within two beds of Case i. Whilst still suffering from slight albuminuria she was attacked with smallpox, the eruption of which appeared on December 14th. This and Case ii. were immediately isolated in the above-mentioned rooms downstairs. The eruption was distinct. The attack for the first few days threatened to be severe. It suddenly abated. She made a rapid and good recovery. Was vaccinated in infancy; vaccine cicatrices of good quality.

CASE IV. T. H., æt. 42, admitted November 30th, into Fuller Ward, for pneumonia. Was discharged, recovered, on 28th December; readmitted for slight attack of bronchitis on December 4th. Eruption of smallpox appeared on the next day. The attack was very modified and mild. Was discharged convalescent on 29th January. Was vaccinated in infancy; vaccine marks of bad quality.

CASE V. J. J., æt. 37, admitted on December 7th, into Cambridge Ward, for paraplegia of three years' duration. Smallpox eruption appeared on January 5th. This was accompanied with a roseolar rash, which at first was attributed to somewhat large doses of belladonna he was taking. The rash became petechial; and in spite of wine, which was freely administered, he sank on January 8th.

Post-mortem examination.—The kidneys were found congested, and weighing fifteen ounces. The tubes were full of epithelium, points of echymosis on the peritonæum covering the whole intestines. Outside the theca vertebralis in the dorsal and lumbar regions of the spinal cord there was a thick layer of fat. There was a small, but very distinct to the touch, patch of softening at the termination of cervical portion of the cord.

CASE VI. J. J., æt. 16, admitted 24th November, into Harris Ward, suffering from inflamed ankle. Eruption of smallpox appeared January 7th, semi-confluent. Although a severe attack, he made a good and rapid recovery. Said to have been vaccinated; no vaccine marks can be seen.

CASE VII. Arthur R., æt. 17, admitted November 30, into York Ward, for enteric fever. Eruption of smallpox appeared on the 7th January, about nine days after he was convalescent from the fever. The attack was very modified. Made a good recovery. Discharged January 26th. Was vaccinated in infancy; vaccine cicatrices of bad quality.

CASE VIII. Walter H., æt. 16, admitted December 7th, into York Ward, for subacute rheumatism. After a course of alkaline and iodide of potassium treatment, purpura appeared on legs. Smallpox eruption, which scarcely became pustular, appeared on January 7th. Was discharged well on 24th January. Was vaccinated in infancy; cicatrices of bad quality.

CASE IX. W. F., æt. 16, admitted November 23d, into King's Ward, for chorea. Smallpox eruption appeared on 9th January. Vaccinated in infancy; no vaccine marks visible. The attack was moderately severe. Has made a good recovery. Discharged February 8th.

CASE X. H. K., æt. 34, admitted November 30th, into King's Ward, suffering from osteo-arthritis. Smallpox eruption appeared on 9th Jan. The attack was moderately modified. Has made a good recovery. Vaccinated in infancy; cicatrices of bad quality.

CASE XI. James D., æt. 17, admitted November 23d, Winchester Ward. Chronic disease of ankle. Smallpox eruption on January 9th; modified attack. Has made a good recovery. Vaccinated in infancy; vaccine cicatrices of bad quality.

CASE XII. William C., æt. 20, admitted December 21st, Fitzwilliam Ward. Chronic inflammation of knee. Smallpox eruption appeared on January 9th; very slight attack. Vaccinated in infancy; vaccine marks of very good quality.

CASE XIII. Christiana S., æt. 23, probationer nurse. Smallpox eruption, which became confluent, appeared on January 9th. Died on the eighth day. Vaccinated in infancy; had three vaccine marks of moderately good quality.

CASE XIV. Ellen C., æt. 19, admitted November 2d, Queen's Ward. Extensive mitral disease with dropsy. Smallpox eruption, which was very modified and distinct, appeared on January 9th. Died, chiefly of the heart-disease, on January 31st. Vaccinated in infancy; vaccine cicatrices of excellent quality.

CASE XV. Mary H., æt. 12, admitted December 12, Drummond Ward. Suffering from knocked-knees. Smallpox eruption, very modified, appeared on January 9th. Discharged convalescent, January 31st. Vaccinated in infancy; vaccine cicatrices of excellent quality.

CASE XVI. Mary G., æt. 29, admitted December 15th, Burton Ward. Phlegmasia dolens. Eruption very modified, distinct, on January 11th. Discharged February 6th.

CASE XVII. Amos W., æt. 40, one of the carpenters of the hospital. Smallpox eruption appeared on January 13, attack very modified. Has made a good recovery. Was vaccinated in infancy; two vaccine marks of good quality. Said to have had smallpox twenty years ago.

CASE XVIII. Mathew B., æt. 52, admitted November 17th, Oxford Ward. Fractured arm. Smallpox eruption, very modified, appeared on January 14th. Discharged well, January 29th. Vaccinated once; vaccine marks very good.

CASE XIX. Florence B., æt. 19, admitted December 14th, Crayle Ward. Eczema. Smallpox eruption, which was distinct, appeared on January 14th. Was re-vaccinated on the same day. The attack was rather severe. There was no trace of the re-vaccination on the seventh day. Was vaccinated in infancy; one vaccine mark of bad quality. Has made a good recovery.

CASE XX. Frank D., æt. 18, admitted December 30th, Oxford Ward. Fractured leg. Eruption appeared on January 15th; attack slight. Was vaccinated in infancy; vaccine marks of bad quality.

The following cases were suffering from smallpox when admitted:

CASE XXI. Elizabeth S., æt. 24, admitted January 12th, suffering from febrile symptoms. Smallpox eruption, distinct, appeared in a few hours after admission; attack slight. Vaccinated in infancy; one vaccine cicatrix of bad quality. Was vaccinated six years ago, but did not take.

CASE XXII. Ellen H., æt. 15, admitted February 4th in a comatosed

state, and suffering from congestion of both lungs. The eruption appeared on the same evening as she was admitted. There was suppression of urine for two days. As soon as the eruption was well out, the head-symptoms began to improve. The attack abated about the sixth day. Has made a good recovery. She was vaccinated in infancy; one vaccine cicatrix of good quality.

CASE XXIII. David E., æt. 25, admitted February 8th. A week ago was thrown off his horse, and in the fall he came down on his back; suffered considerably from pain in his back, which he attributed to the fall, until he was admitted. On admission, besides the pain in the back, for which he came from Worthing to the hospital, he coughed bloody sputa, and had other evidences of congestion of lungs. Smallpox eruption appeared the day after admission, accompanied with roseolar rash, which became petechial. He became very delirious and tremulous, and sank on February 13th. On post-mortem, the upper lobe of right lung was intensely congested, while the whole of lower lobe was in a state of red hepatisation; the lower half of left lung was intensely congested. The heart was semi-contracted, and contained a decolorised clot. The kidneys weighed sixteen ounces, and were very congested. The cortices on section were of extremely coarse appearance, and many tubes were blocked with epithelium.

The following cases probably caught the infection in the Hospital, and were attacked with the disease after they were discharged:

CASE XXIV. George K., æt. 40, admitted October 16th into Oxford Ward, for fracture of leg. Was sent to the Wimbledon Convalescent Hospital on December 7th. Smallpox eruption, which was confluent, appeared on December 17th. He is said to have had a slight mark of vaccination on each arm.

CASE XXV. Michael S., æt. 48, admitted October 26th into Harris Ward, and afterwards removed into Hope, for pyelitis. Discharged December 28th. Slept that night at Vauxhall-bridge-road; went home to Fellday, near Dorking, on the 29th. Eruption appeared on either the 6th or 7th of January. He died of confluent smallpox on the 12th. It is said that he was vaccinated when young, but no notice was taken of the marks. I am indebted to Mr. Jardine of Dorking for some of the particulars of this case.

CASE XXVI. Sarah F., æt. 19, admitted October 12th, Cholmondeley Ward. Discharged December 19, 1870. Smallpox eruption appeared December 29th. Although the attack was said to have been very severe, she has made a good recovery. She was vaccinated when she was two years old.

CASE XXVII. John T., æt. 3, admitted November 2d, Princess Ward. Stone in the bladder. Lithotomy performed on November 15th. Some erysipelatous swelling of prepuce appeared after the operation. On

January 3d was seized with sore-throat, which was supposed to be due to hospital air. Mother was advised to take him home. Smallpox eruption appeared on January 4th or 5th. Died January 11th. *Was never vaccinated.*

Thus we have had twenty cases attacked with smallpox in the Hospital; four having received the infection in the house were discharged, and afterwards attacked with the disease; and three were admitted before the appearance of the eruption—the febrile symptoms being attributed to other causes.

Of these twenty-seven cases, six died—four in, and two out of the Hospital. Three of these were suffering at the time of death from serious organic lesions: for instance, one had softening of the spinal cord of three years' duration; another had extensive mitral disease with dropsy, to which death was more attributable than to the attack of smallpox, which was of the mildest description; and the third had pyelitis of some standing. There was one which was at the time of the attack just convalescent after lithotomy; another, the nurse, of a delicate constitution, was attacked whilst in a weak state of health; and the remaining one was admitted with smallpox and congestion of the lungs. In this case, as in Case v. that died, there were petechial patches all over the body.

Of these fatal cases, three were never protected by vaccination. Of the other three that *were* vaccinated, one had the disease, as already stated, in a very mild form, and died of her primary disease; the other two had it in the confluent form—one of whom was at the time suffering from pyelitis; and the other was a delicate female with three indifferent vaccine cicatrices.

There were twenty-one cases that had been vaccinated. Of these, fourteen had vaccine marks of very indifferent quality, and seven had very good marks. Of those with indifferent marks, five had the disease in a very modified form, two unmodified, and seven moderately modified. Of the seven with good marks, the disease was very slight in all, with the exception of one, Case xxii. Although this case was for the first few days very severe, the attack was certainly modified, and the case did well, without

much if any disfigurement; and although this patient's mark was good, it may be observed there was but one.

One of the vaccinated cases was re-vaccinated six years ago, but was unsuccessful; and one had smallpox twenty years ago. Two cases are *said* to have been vaccinated—these were attacked after leaving the Hospital—one of them had the disease in an unmodified form and recovered; the other died of confluent smallpox on the sixth or seventh day of the disease. Three were unvaccinated, and all died. I have no note of vaccination in Case i.

From the brief account given of each case we find—and it is important to bear the fact in mind in reference to the origin and the spread of the disease—that all the cases that were attacked with the disease had been patients in the Hospital for periods varying from *sixteen days to four months*.

It is also important to note *the order in which the cases occurred in the different wards*. Of the twenty-nine wards that were at the time occupied, cases of smallpox occurred in seventeen, none of which happened in the new wing. The wards in which the cases occurred were situated on each of the three floors. The first (Case i.) occurred on the first floor, and on the female side; Cases ii. and iii., occurring December 14th and 15th, on the first and second floors on the same side; Case xxvi., occurring December 29th, on the third floor, again on the female side. The next seven cases, occurring between the 5th and 7th of January, happened on the first and second floors, and all were on the men's side except one; and all the cases, seven in number, which were attacked on the 9th of January, occurred on all the three floors, and both on the male and female sides—thus, one on the ground-floor, three on the first floor, two on the third floor, and the other was the nurse. Of the six cases attacked between the 11th and the 15th January, three occurred on the ground-floor, one on the second, and one on the third floor. The other was the carpenter employed about the Hospital.

Immediately on the appearance of the eruption all these cases were isolated, with one or two exceptions in which the eruption was supposed to be due to the medi-

cines that the patients were taking at the time. The first three cases were placed in the refractory rooms in the basement of the south wing; and as soon as the others broke out, they were all sent into the convalescent wards at the top of the Hospital. The nurses attending them were strictly prohibited from mixing with the other inmates of the Hospital; and no one else saw them but the medical officer in attendance on the different cases, and he generally visited them after he had made his rounds. In addition, every precaution was taken in the way of disinfection; for the atmosphere of the whole Hospital has been so thoroughly impregnated with carbolic acid, from sheets steeped in it and hung before the door of each ward, and from the floors being washed with a weak solution of the acid, that it has positively been painful to some with very sensitive organs of smell.

We were at first completely at a loss to account for the introduction of the infection into the Hospital. Knowing the prevalence of smallpox in the neighbourhood, we naturally supposed that it was introduced by the patients' friends who visited them. Acting on this idea, the visitors were at once (on the appearance of the eruption in Cases ii. and iii.) prohibited from seeing their sick friends, unless they were very ill. I have since, however, been able to trace, I think satisfactorily, the origin of the disease here to Case i. This patient, who had been in the Hospital for eleven weeks without once leaving it, was allowed to go out for a few hours on November 10th, to visit a friend. This friend, I subsequently ascertained, was at the time suffering from smallpox. That this patient received the infection on the day she went out, or on the next, is certain, if we allow thirteen times twenty-four hours as being the period of incubation; that is, from the reception of the poison to the *appearance of the eruption*, as the latter certainly appeared on the 25th, if not on the 24th, of November. I think we may safely say, then, that this patient caught the infection from her friend she visited on the 10th of November. As this case was immediately sent away from the Hospital to the workhouse, it was difficult to understand how the infection was com-

municated from it to Case ii., as the latter was on another floor, and was attacked three weeks after the first case. There was not quite the same difficulty to account for the infection in Case iii., as this patient was in the same ward at the time Case i. was attacked; but as the former was not attacked for *three weeks* after the removal of the latter from the ward, I doubt very much whether Case iii. was infected during the time Case i. was with her in the Hospital.

Probably Cases ii. and iii. were not infected through the medium of visitors, as they denied having had any one to see them for some time.

But it was even more difficult to account for the fourteen cases that were attacked between the 2d and the 6th of January, seven of which occurred on the same day, because the visitors were still restricted, and isolation was most rigidly observed in Cases ii. and iii.

It was thought that the atmosphere was possibly the medium by which the poison was propagated from the Cases ii. and iii. This view, however, is highly improbable, as the rooms in which these cases were placed are situated some distance from the main corridors, even supposing that the door leading from them into the Hospital was not kept closed. Besides, although five of the fourteen cases attacked were on the same side of the Hospital as these rooms, none of the cases occurred in the wards nearest to them. On the contrary, the first case happened on the top floor; no case occurred in the Oxford, the ward nearest to these rooms, until January 14th and 15th (see Cases xviii. and xx.).

Having failed, therefore, to account satisfactorily for the spread of the disease by the above theory, and by others which suggested themselves to me, but which I need not detail, I investigated each case separately; and by reckoning back fourteen days, or thirteen times twenty-four hours, we arrive at the probable day on which the infection occurred, which happened to be closely connected with changing of the bed-linen. This takes place at St. George's Hospital on Mondays and Thursdays, in this manner: all the dirty linen is sent to be washed on Thursdays,

and the clean linen is returned on the same day; generally one sheet is put on the bed at once, and the other on the following Monday.

Whether the connection which appears to exist between the occurrence of the infection in these cases and the linen-changing days be purely accidental or not, I shall not attempt to decide. I shall merely content myself by simply stating the following facts, and leave others to draw their own inferences.

As already stated, the eruption of smallpox appeared on the fourteenth or fifteenth day in Case i., after this patient went home to see a friend that was ill of the same disease. The eruption showed itself certainly on the 25th of November. The initiatory fever must therefore have commenced on November 23d, if we allow forty-eight hours, or one whole day and a part of two others, for the period which elapses between the commencement of the fever and the appearance of the eruption. The sheets of this patient were sent to the laundry, with all the other dirty sheets, on the following day, Thursday, before it was suspected that she was suffering from smallpox. Now, if it be admitted, as it is stated by Mr. Marson, that the infection of smallpox is communicable from the moment the initiatory fever begins, it is probable, or at any rate possible, that the sheets which this patient slept in during the whole of Tuesday and Wednesday night became infected, and in this state were sent to the laundry on the following day with the other sheets. As this case, like several of the others, was suffering at the time of the attack from other diseases calculated to mask the premonitory symptoms of a mild attack of smallpox, the latter was not suspected until the appearance of the eruption. Besides, in this instance the patient was, and had been for some time, taking large doses of iodide of potassium, to which the eruption was at first attributed. It is just possible, therefore, that the eruption really appeared the day before we noticed it—that is, on November 24th. If so, infection must have taken place on November 10th; and this is rendered more probable from the fact, that this was the day on which she visited her friend with smallpox. If

the eruption appeared on November 24th, the patient's sheets must have been sent to the laundry after she had slept two nights in them whilst in a state capable of communicating the infection. They were sent with the rest of the linen to be washed on *Thursday November 24th*, and returned on *Thursday December 1st*, and placed on the beds.

Now, smallpox eruption appeared in Cases ii. and iii. on the 14th and 15th of December respectively; the days of infection were therefore the *1st and 2d of December*; on the same day and on the following day, it will be observed, as the supposed infected sheets of Case i. were returned from the wash and placed on the beds. This at once solves the difficulty, to which we have already alluded, in accounting for the infection spreading to Case ii. in a ward on the second floor, some distance from the ward on the first floor in which Case i. was. It also removes the difficulty we had in explaining how Case iii., being in the same ward as Case i., became attacked with the disease in *three weeks*, instead of a fortnight, after the removal of the latter.

As the eruption was not noticed in Case iii. until noon on Thursday December 15th, the sheets must have been sent in an infected state—the patient having slept two nights in them whilst infectious—with the others on the morning of the same day to the laundry. The same sheets, with the others, were returned, and some of them placed on the beds on *Thursday December the 22d*.

Three cases showed smallpox eruption on *Thursday January 5th*. They must have therefore received the infection on the *23d of December*—the day following, it will be observed, the placing of infected sheets on the beds. The eruption appeared in four cases on Saturday January 7th. These were therefore infected on Christmas-day—*three days after the return of the infected sheets*.

Some of the sheets that are supposed to have been infected, and which were returned on the 22d of December, were placed on the beds on Monday (the other linen-changing day), *the 26th of December*. Smallpox erup-

tion appeared in seven cases on *Monday* the 9th of January. These must have received the infection on the 27th of December—the day following the placing of infected sheets on the beds.

Smallpox eruption appeared in Case xxvi. on *Thursday* the 29th of December. Infection probably took place on Friday the 16th of December, the day following the changing of the linen. In this case, however, it must be admitted that I have no evidence to show that infected sheets were returned from the wash on the 15th of December—infected sheets were sent only on this day.

In Case xvi. eruption appeared on Wednesday the 11th of January. Although the infection probably occurred on the 29th of December, I have not been able to ascertain that infected sheets were returned from the laundry on the 29th; but it is interesting to note that this date was also on a *Thursday*. It is just possible, or even probable, that some of the sheets that were returned on the 22d were placed on the beds on the 29th of December.

There now remain but three cases unaccounted for. Of these, Cases xix. and xx. were attacked with smallpox on the 14th and 15th of January respectively. They caught the infection, therefore, on Sunday and Monday the 1st and 2d of January. Thus there appears to be no connection between the linen and the first of these two cases, except that three days before, December 29th, Case xvi. was infected; but it is to be observed that the infection in the other occurred on a *Monday*—one of the linen-changing days.

Lastly, Case xvii. was the carpenter of the Hospital, who probably caught the disease through contact, in the course of his duties about the house, with the infected cases.

Probably the foregoing will be found more intelligible, and the connection between the linen-changing days and the days of infection more apparent, if stated in the following manner:

Case i. saw a friend suffering from smallpox on *Nov. 10.*

The same patient presented smallpox eruption on November 24 or 25. Probably exposed to infection on *Nov. 10.*

The sheets of Case i., in which the patient had slept one or two nights, were sent to the wash without undergoing disinfection on November 24.

Smallpox eruption appeared in Cases ii. and iii. on Dec. 14 and 15 respectively.

The same sheets returned and placed on the beds on *Dec. 1.*

Probably exposed to infection on *Dec. 1 and 2.*

Sheets of Case ii. were sent to the laundry after the patient had slept in them two nights, without being disinfected, on *Dec. 15.*

Eruption of smallpox appeared in Case xxvi. on Dec. 29. Probably exposed to infection on *December 15.*

The infected sheets sent to the wash on Dec. 15 were returned on *Thursday Dec. 22.*

Three cases showed the eruption on Thursday Jan. 5. They were therefore probably infected on *Friday Dec. 23.*

Three presented the eruption on Jan. 7, and were therefore infected on *Dec. 25.*

Some of the above sheets, returned on Dec. 22 were placed on the beds on Monday *Dec. 26.*

Seven cases presented the eruption on Monday Jan. 9. They therefore received the infection on *Dec. 27.*

Clean (?) sheets placed on beds on *Monday Jan. 2.*

Smallpox eruption appeared in Case xx. on Jan. 15. Infection received on Monday Jan. 2.

It follows, that if it be true that the disease was propagated through the medium of the laundry, the present outbreak teaches us some very important practical lessons, some of which are :

1st. That the disease is communicable during the period extending from the commencement of the fever to the appearance of the eruption; and that any cases showing febrile symptoms during such an epidemic as we have lately experienced should be closely watched, in order that they might be isolated early and the linen be thoroughly disinfected.

2d. That the ordinary temperature of the water in which infected sheets are washed—which was *said* in this instance to have been boiling—is not sufficient to destroy the fever-poison.

3d. The importance of disinfection of all linen used by

patients suffering from this disease by any of the ordinary disinfectants generally employed. After the 22d or 29th of December all the cases attacked were discovered before the linen-changing days; the sheets were therefore thoroughly steeped in a solution of carbolic acid before they were sent to the laundry. It is a fact worth observing, that but two cases were infected that could be attributed to the sheets after the above dates.

This outbreak also supplies us with farther evidence, if any were required, of the protective power of re-vaccination against smallpox. On the 12th of January almost all the patients and inmates were subjected to this operation, and there has not occurred a single case of smallpox since the 14th of January.

Besides the care taken to disinfect the sheets in all the cases after the 22d of December, much of our immunity from the disease after this date is no doubt to be attributed to re-vaccination.

THOMAS JONES, M.D.

XV. RESULTS OF RECENT VACCINATION IN ST. GEORGE'S HOSPITAL.

IN the month of November of the past year (1870) the first case of smallpox broke out among the patients at St. George's Hospital (this patient had been an inmate for eleven weeks previous). In a short time several more patients were attacked, increasing the number to eighteen. It will not be necessary for me to give an account of the cases of smallpox, as a full report regarding them will be found in Dr. Jones's paper (see p. 229). I propose merely to give the results of the vaccination. As the disease was still spreading, it was resolved by the Board of the Hospital, at the recommendation of the medical staff, that all the nurses and patients in the Hospital should be at once vaccinated, that only urgent cases should be admitted, and that these should be vaccinated, if thought advisable. It was also resolved that the visits of the friends of the patients should be stopped. These measures were speedily taken, and from that time there was no farther increase of smallpox in this Hospital; whilst at this date (March 28th, 1871) it is gratifying to observe there is not a smallpox patient remaining in the Hospital, proving how necessary it is to apply the usual precautions; and when these are carried out effectually, how certain is the result. The vaccination was commenced on the 13th day of January.

Three methods of vaccinating were adopted, namely, puncture, abrasion or scratching, and vesication. The puncturing was performed in the ordinary way; that is, by grasping the arm (usually the left) with the left hand, drawing the skin tense, and then making from four to five punctures down to the cutis-vera with an arrow-headed

lancet, having a central groove running to the point; and in this groove the lymph was placed so that it flowed well into the puncture. If points were used, these were slightly moistened, passed into the puncture, and allowed to remain there about three minutes, to give the lymph an opportunity of being absorbed. In abrasion or scratching the arm was held in the same manner as for puncturing, but an ordinary bleeding-lancet used, and two or three small parallel scratches were made, taking care that they were only deep enough to allow the smallest quantity of blood to exude; the lymph, if liquid, was then rubbed well in with the point of the lancet; if points were used, these were first moistened by the breath, and rubbed into the different scratches, until they presented a shining appearance. Vesication: three or four small blisters were made by means of a blistering-fluid the night previous to the vaccination; on the following day they were pricked to allow the serum to exude, and then the lymph was applied to the raw surface.

From the number of cases vaccinated in the Hospital, it has appeared to me that the scratching was much more effectual than the puncturing. I am not in a position to speak as to the success of vaccination by blistering, as only a few cases were treated in that way. I think that it is necessary to take one or two precautions in vaccinating by means of scratching—namely, that persons advanced in years, or those presenting an unhealthy appearance, should not be operated on in this manner, as we have had as a result several cases of very inflamed arms. The arm becomes swollen and red, the inflammation and swelling often extending to the hand; the glands in the axilla become affected; and very often the vesicles slough, leaving sores which have to heal up by granulations. It seems also necessary that the scratches should be *parallel*, and not crossed, because under the latter circumstances the skin is much more likely to die.

Before giving an analysis of the cases that were vaccinated, it would be as well to describe what is meant by the expression a 'good' and 'bad' mark, which I frequently use.

By good cicatrices I mean those that vary in size from that of a threepenny-piece to a shilling; varying also in shape, some being oval, others round, others having several radiations from the edges. They usually have a dull-white appearance, with a well-defined margin, and on the floor of the cicatrix numerous small black specks or indentations ought to be observed, these being due to the ulceration of the rete mucosum, exactly similar to the smallpox mark; it is also said that a good cicatrix ought to be seen at a distance of several yards.

Bad cicatrices must be considered to be useless as regards the protection they give from smallpox. These, again, may vary in size; but they are usually smooth and shining on the surface, without any well-defined margin, and without any indentations, sometimes being so slight that they can only be recognised as vaccination marks by the position they have on the arm.

Up to the 3d day of February, 225 patients were vaccinated, varying from three weeks to sixty-three years of age.

Of this number, 5 were vaccinated for the first time, and all were successful.

Of 89 who had 'good marks,' 58 were successful.

Of 56 who had 'bad marks,' 44 were successful.

Of 31 vaccinated twice, 13 were successful.

Of 18 who showed no marks, but were said to have been vaccinated, 12 were successful.

Of 26 who had had smallpox, 21 were successful.

I think that it is necessary to note, that the older a person is, the more likely is it that the re-vaccination will be successful. For instance, out of those cases which I vaccinated, taking those with good and bad marks only, including those whose ages ranged from infancy up to the 21st year, 49 were vaccinated.

Out of 29 of those who had good marks, 9 were successful.

Out of 20 who had bad marks, 13 were successful.

Including those whose ages ranged from the 21st to the 42d year, 83 were vaccinated.

Out of 51 of those who had good marks, 41 were successful.

Out of 32 who had bad marks, 31 were successful.

Taking those whose ages ranged from the 42d to the 63d year, 12 were vaccinated.

Out of 9 of those who had good marks, 6 were successful; whilst 4 who had bad marks were all successful.

RICHARD WILSON, *Obstetric Assistant.*

XVI. A RETURN SHOWING THE RESULT OF RE-VACCINATION

AMONGST THE NON-COMMISSIONED OFFICERS, TROOPERS, WOMEN, AND CHILDREN (IN ALL), IN THE 1ST REGIMENT OF LIFE-GUARDS, 1871.

Persons.	Character of eruption.	In those who bore good marks of previous vaccination.	In those who bore no marks of previous vaccination or smallpox.	From recent vesicle.	From fluid lymph contained in capillary glass tubes.
Non-commissioned Officers and Troopers.	A perfect vaccine pustule A modified do. . . . A failure in Total	10 32 282 <hr/> 324	. . . . . . . .	. . . . . . . .	10 82 282 <hr/> 324
Women.	A perfect vaccine pustule A modified do. . . . A failure in Total	11 20 43 <hr/> 74	. . . . . . . .	11 20 48 <hr/> 74	
Children.	A perfect vaccine pustule A modified do. . . . A failure in Total	4 21 51 <hr/> 76	4 <hr/> 4	8 21 51 <hr/> 80	

From the above return it will be observed that in all 478 persons were vaccinated. Of this number, 324 consisted of the non-commissioned officers and troopers of the

regiment. All these were vaccinated with fluid lymph, obtained from the Medical Department of the Privy Council. The remainder of the number, consisting of the women and children of the regiment, and numbering 154 persons, were vaccinated from recent vesicles.

The number of successful cases of re-vaccination among the males (and by *successful* I mean only those in which a perfect pustule was obtained) will be seen to be very few indeed. Ten cases only come under this heading out of a total of 324 revaccinations, or just three and a quarter per cent, and the number of modified pustules amounted to only 32. I believe the lymph used to have been as good as possible; and I account for the number of failures by the fact, that almost every one of these men had been carefully re-vaccinated on joining the regiment as recruits. I say almost, because I believe one or two old soldiers entered the service before re-vaccination was adopted in all recruits.

Among the women the results will be seen to be somewhat different. Eleven cases of perfect pustules resulted out of a total number of 72, which gives just nine per cent, which is nearly three times the number that occurred among the men. The majority of these had not been re-vaccinated since infancy. The number of modified pustules in this class was 20.

Eighty children were vaccinated, ranging from the age of two months up to fifteen years. Four of the successful cases occurred in infants who had never been previously vaccinated, thus leaving only 4 successful cases in 76 re-vaccinations. The number of modified pustules in this class was 21 only.

EDGCOMBE VENNING.

XVII. REPORT OF MEDICAL CASES

ADMITTED DURING THE YEAR ENDING DECEMBER 31ST, 1869.

THE same classification has been adopted for the present annual Report of the medical cases under treatment in this Hospital during the year 1869. The total number of admissions during the year was 1654: men, 828; women, 826. Out of this number, 240 terminated fatally; 28 of which were cases brought in dead, or dying within twenty-four hours of admission. The daily average number of patients in the medical wards was 136; the rate of mortality, 13.4 per cent; mean residence, twenty-six days. The year was not remarkable for any epidemic, nor did the type of cases differ in any special manner from those ordinarily observed.

The classified list of cases is appended to this Report. A few remarks may be offered, together with detailed accounts of the most interesting cases.

Fevers. The cases of typhus admitted during the year were few, and none proved fatal. The number of cases of enteric was rather larger than for the preceding year. Of the fatal cases, one was complicated with epistaxis and purpura, from which the patient had been suffering previous to the fever; a severe attack of epistaxis and melæna preceded death. Another fatal case was complicated with otitis, and at the necropsy pus was found in the mastoid cells of the temporal bone. A patient was attacked with the fever after having been in hospital for seven weeks. She was nine years of age, and was admitted for chorea; the jactitations were not altered during the fever, but she left the Hospital very much quieter. The cases of simple fever require no comment. Two cases

of scarlet fever occurred, which were remarkable for relapses. One case is here given.

Frederick T., æt. 18, was attacked with scarlet fever on the 18th of March. He was convalescent on the 1st of April, and desquamation took place freely. On the 26th he was seized with sore-throat and rigors, and on the following day (27th) the rash was fully developed. Some redness of the skin remained for some time, and the rash did not entirely disappear until the 10th of May; after which desquamation again took place, and he subsequently made a good recovery.

One fatal case was complicated with pyæmia.

Blood-poisoning. The number of cases of erysipelas was one-third that of the former year. Two cases were fatal, one patient being fifty years of age; in the other, death was caused by purpura and granular kidneys. The case of glanders is worth recording.

Richard O., æt. 36, admitted under Dr. John Ogle; a groom, who had been in the habit of attending at the stables of a veterinary surgeon. He had been ill three weeks, his symptoms having been rigors and feverishness. No running at the eyes or nose had been noticed. He had cut his thumb some time before admission, and this was followed by some small abscess. Two weeks before admission, one week after being taken ill, the glands of his face and neck began to swell, and he became slightly delirious at night. There was no history of any previous illness. On admission he was very tremulous, in a state of great prostration; the glands of the face and neck were very much swelled, tender, and painful; the tongue was cedematous, and was not put out; his breath was extremely offensive, and the fætor was perceptible at some distance; the skin was slightly yellow, as in pyæmia; the conjunctivæ also slightly tinged; the pulse rapid-running and very feeble; noisy râles were heard over the lungs; the fauces were red, but not ulcerated; there was much dyspnoea and some dysphagia, and the tone of the voice was harsh and stridulous; the urine was very albuminous; no glands but those mentioned were found enlarged. He was treated with wine and chlorate of potash, and Condry's fluid was injected by the spray apparatus. In the evening of the 25th the dysphagia and dyspnoea increased. He died at 2 A.M. from apnoea.

The following is the account of the post-mortem examination by Mr. Pick:

There was a scar on the left thumb over the metacarpo-phalangeal joint, and a cicatrix, as if from an ulcer, on the thumb in the course of the absorbents, about two inches above the first-mentioned scar. There was great swelling and œdema of both sides of the neck, but more especially the left side, and in both parotid regions on the face. The lower two-thirds of the upper lobe of the right lung was quite solid, and in a

state of gray hepatisation; the disease was more advanced in front than behind, where the lung-tissue was completely broken and infiltrated with puriform fluid. Under the microscope it presented nothing but pus corpuscles (for the most part ill formed) and the débris of broken-down material. A small portion of the lower lobe in contact with this was also in a state of hepatisation, but the lung-tissue was not broken down. The left lung was congested, but natural. The heart was semi-contracted; there were decolorised clots in all the cavities; but with this exception, the blood throughout the body was generally fluid. The muscular structure was soft and rotten, but examined microscopically did not present much fatty change; the transverse striæ of the muscles were well marked, though there was an excess of fat molecules. Upon cutting through the tissues of the neck they were found to be infiltrated with fluid, and many of the cervical glands in a state of suppuration, forming circumscribed abscesses full of thick creamy pus. There was much swelling and œdema of the larynx above the true vocal cords, especially of the epiglottis, and its mucous membrane full of fluid and transparent; the œdema did not extend below the cords, but the mucous membrane of the trachea was injected and redder than natural. The liver was very large and fatty, the blood in it was extremely thin and watery; the spleen was quite rotten and diffuent; the kidneys were very large, weighing together 24 ounces; they were very coarse and congested, and microscopically the tubes were found to be much enlarged, and full of fat globules. There was suppuration in the left parotid, but not in the right; the axillary glands were natural. Studded throughout the lungs were patches of peculiar appearance; they were of a slate colour, gradually shaded off into the healthy lung, and were of about the size of hazel-nuts: the lung-tissue did not appear altered except in colour, and after immersion for twenty-four hours in water or spirit these patches resumed the natural colour of the lung-tissue.

The three cases of diphtheria terminated favourably.

Jane S., æt. 20, was admitted with a very bad sore-throat; the tonsils and soft palate were nearly covered with a thick yellow membrane. She was very ill, and the urine was very albuminous. The treatment adopted consisted of frequent washing with Condy's fluid, thrown against the affected parts by the spray apparatus, and the administration of iron and chlorate of potash with wine. The patient was admitted on the 16th of January with a history of three days' illness. The diphtheritic membrane had disappeared on the 23d, and the patient was much better.

Sarah H., æt. 18, was admitted with similar symptoms, the membrane only extending over one side of the fauces. The same treatment was adopted, and the membrane was gone in four days, and the patient recovered. These patients were under the care of Dr. Fuller.

Henry N., æt. 23, was admitted with a diphtheritic membrane over the soft palate and tonsils, which disappeared very rapidly under the use of Condy's fluid. A decided and immediate effect on the membrane

was evident after the application of the permanganate, the membrane becoming brown and shrivelling up.

Rheumatism. In the report for the year 1868 the number of cases of this disease will be found; and from peculiarities in the temperature &c. of the year, the number was large, and the type severe. During the year 1869 the number was smaller—175 as compared with 217.

In the acute cases, it will be found that the percentage of cases in which the heart was affected is very nearly the same for both years; indeed the close approximation of the percentage is so remarkable, that it can scarcely be attributed to coincidence.

In 1868 the number of acute sthenic cases was 85; in 52 of which the heart was attacked. In 1869, 77 cases of acute rheumatism were admitted; 45 of which suffered from heart-disease; that is to say, in 1868 the percentage was 61, in 1869 it was 58.

But the percentage of cases of pericarditis is even more remarkable. In 1868, 22 cases occurred out of 85; in 1869, 20 out of 77; that is to say, the percentage in '68 was 25·88, in '69 it was 25·9.

This concurrence of numbers seems to show that the acute sthenic form has been grouped in a systematic way, and supports the idea advanced in a paper on Rheumatic Pericarditis in the last volume of these *Reports*, that pericarditis appears to select certain cases which present peculiar and recognisable characteristics. Of other forms of rheumatism I would also say, that there are groups of cases included under this too comprehensive term, which pericarditis and carditis appear to avoid.

Gout. Many cases of gout come under observation, instances being generally found in the upper class of men-servants from large houses.

About one-seventh of the cases are women — cooks, washerwomen, and nurses. The men are publicans, travellers, coachmen, butlers, painters. There is seldom any history of inherited predisposition.

Acute Tuberculosis. The following case, which illustrates the deposit of tubercle in an unusual form, is worth re-

coding. The appearance of the throat was peculiar, and indicated the nature of the disease, which was afterwards developed in a very singular manner.

The patient was a clerk, of scrofulous appearance, aged 21. He was admitted on the 19th of March, suffering from sore-throat. There was no history of phthisis in the family, and he said that he had never suffered from cough. His throat had been sore for one month, and there had been some hoarseness and dysphagia. On admission he had a little cough; his voice was without tone; the fauces were red and sore, and there was a round circumscribed ulcer on the right tonsil; the ulceration extended over the neighbouring parts, beginning with minute yellow specks of tubercle, then gradually softening and ulcerating. In two days the left tonsil was affected; the soft palate and uvula were thickened, and of a yellowish colour, with minute specks of tubercle. There was some dysphagia, and pain in the upper part of the trachea. Deposit of crude tubercle was discovered at the right apex. At the end of March the disease had progressed; he was much thinner, and two or three clean punched-out ulcers were found on the edge of the tongue. He suffered great agony from pain; and fresh deposit of tubercle taking place in the lungs, he sank rapidly, dying on the 12th.

After death, the posterior part of the tongue, the fauces, the pharynx, and the larynx were found studded all over with minute specks of tubercle; situated in the submucous cellular tissue, and giving to the mucous membrane a roughened and granular appearance, as if sprinkled with minute grains of sand. Here and there the tubercle had ulcerated; and in some places three or four of these ulcers had coalesced so as to form excavations, the largest of which was the size of a threepenny-piece. A considerable deposit of tubercle was found in the lungs. The intestines were much ulcerated.

The following case affords an instance of a very rare form of disease, and as such deserves a lengthened report. The patient was a soldier, and the previous notes of the history were obtained from Netley Hospital. The tumour was exhibited at the Pathological Society, and in their *Transactions* for the year will be found a description, accompanied by an illustration.

Edward W., æt. 36, was a soldier, but had never served abroad. In 1850 he had an attack of jaundice and brain-fever; and in 1860 he caught typhoid whilst in charge of the fever wards. In 1867 he contracted syphilis, and in the following January three shallow ulcers broke out on the face. On the 3d of May 1868 he was admitted into the surgical wards of the Netley Hospital with a sprain of the right ankle, which got well in two days. Then fever came on, attended with sweatings, depression of spirits, weakness, loss of appetite, and nausea. There was headache too, but this went off with the use of purgatives. On the 18th of May he was transferred to the medical wards. His con-

dition was then anæmic; heart healthy, action feeble; pulse 100; some flattening under the clavicle, and an occasional crackle was heard; respirations twenty-two in the minute. He suffered a little from nausea and constipation; abundant deposit of lithates in the urine, which was otherwise healthy. He was invalided for general ill health in June. In July he suffered from retching, and then was first aware of the presence of an abdominal tumour. It was first observed in the right side of the belly, and was supposed to be connected with the liver. Food was digested with difficulty, and lay heavy in the stomach; subsequently he suffered from cutting pain after food. Since that time the belly had been gradually increasing in size.

On admission into this Hospital December 16th, 1868, he was thin, not of large build, with light-brown hair, and of a scrofulous appearance; very intelligent. The belly was large and doughy; very little fat was found about the body; measure round the umbilicus forty-one inches. No fluid could be detected; the intestines were much distended, overlying a swelling situated in the right side of the abdomen, from the liver to the pelvis. Here there was deep-seated dullness on percussion.

There was no pain nor tenderness in the belly, and the skin covering the abdomen being thin and without fat, the coils of distended intestines could be easily traced. The hand could not detect any tumour by palpation, the distension of the intestines completely masking it; and there was no evidence that the kidney was enlarged; but there was a feeling of doughiness on pressing deeply into the right flank, and much dullness on percussion. The veins of the abdomen were enlarged; the urine was not albuminous; no disease was detected in any organs. It was conjectured that a large tumour was forming in the belly, probably connected with the mesentery, but of what nature it was difficult to say; probability pointed to malignant disease. The tumour increased in size, and the patient emaciated very rapidly; he suffered a great deal from retching and vomiting, which distressing symptoms were relieved by morphia *sub cutem*. He remained conscious and intelligent throughout, and died on the 2d of April, after much suffering.

The examination of the body was made by Mr. Pick. The body was extremely emaciated; the abdomen enormously distended by a firm solid tumour, which appeared to fill the whole cavity. The lungs were compressed, much congested, and very rotten. The heart was partially contracted and empty; the valves natural.

Upon laying open the abdominal cavity, an enormous solid tumour was discovered, almost entirely filling the cavity. It extended from the level of the fourth rib above to below the symphysis pubis, dipping down into the true pelvis; and it extended from one side of the abdomen to the other—situated more on the right side, however, than on the left; in which latter situation the intestines were found massed together, with the exception of the ascending colon, which lay in front of the tumour, and was closely adherent to its anterior surface. The peritoneum covering this portion of gut could be traced from the surface of the bowel on to the front of the tumour, the anterior surface of which it covered, and was then reflected on the one side on to the abdominal wall, on the other over the remainder of the intestine; so

that the tumour lay entirely behind the peritoneum. The tumour, when removed from the body, was found to be entirely solid. It weighed 29½ lbs.; its greater circumference was 39½ inches; transverse circumference 30 inches; greatest diameter 17½ inches; transverse diameter 11½ inches. The tumour was found to be composed of fat.

Three interesting cases of intussusception of bowel with polypus were admitted.

J. W., *æt.* 45, a hawker, was admitted November 17, under the care of Dr. Wadham, after an illness of three weeks, the first symptoms of which were pain about the navel, with much tenderness; vomiting did not come on until two days before admission. The bowels had freely acted on the 14th, but there had been no action since; and since the 14th he had been very sick, vomiting fecal matter. On admission, he was suffering from hiccup; was dark and drawn under the eyes; very anxious; extremities cold; pulse small. On palpation, hardness was detected above and to the left of the navel; the tongue was not large, but furred; plenty of urine was passed. The case seemed to be one of obstruction of the small intestine, with peritonitis. He was ordered one grain of brandy and opium every four hours. On the 19th he was better; not so anxious; the urine was passed in quantity, and was natural. On the 21st, though there had been no action of the bowels since admission, there was no vomiting and no pain; he had a good pulse, and some appetite. On the 21st a stool was obtained by the use of castor-oil; and he improved after this rapidly, so that by the 27th he was convalescent, the bowels acting. On the 28th of December all medicines were omitted, and the bowels were acting naturally. A little pain remained, but he was sufficiently recovered to go out. On the 5th of January he was readmitted. He had continued in fair health up to that day, when at 2.30 he was seized after dinner with sudden pain and vomiting. On admission, at 5 P.M., he was collapsed; aspect very anxious; features drawn; pulse scarcely perceptible; tongue slightly coated; he was vomiting. At 9.15 he was dead.

At the examination, a quantity of digested food and feces were found in the peritoneal cavity. About three feet from the ilio-cæcal valve, two inches of the intestine was intussuscepted, the upper bowel being pushed into the lower. This intussusception was peculiar, as there was a complete passage by the side of it; so that the natural channel of the bowel was not entirely interrupted, though materially constricted. It appeared as though only a portion of the calibre of the bowel had been invested, like the finger of a glove. At the place of intussusception the gut was very thick, and in one place had given way, leaving a ragged opening sufficiently large to allow the passage of a pencil.

William A., *æt.* 20, under the care of Dr. Barclay, was admitted January 20th. He had suffered from symptoms of obstruction two years before admission, and at that time he had been ill one week. His present illness dated from the 15th. After dinner at 2.30 he felt sudden pain in the abdomen to the right of the navel; he vomited at 8 P.M.

The bowels had acted on the morning of the 15th, but not from that time to the date of admission. The vomit was reported to have been faecal just before admission. When admitted he was retching much; the tongue was thick and fissured; pulse 116, very small; the belly was much distended and tympanitic; a hard mass the size of two walnuts was discovered lying quite superficially to the right of and close to the navel; the urine was not albuminous, and was abundant and natural; there was no action of the bowels. Faecal vomiting came on during the afternoon of the 23d, and continued. Subsequently his bowels became very much distended and the belly very tympanitic; the pulse became more feeble; he continued to pass plenty of urine; and died on the 26th, sensible to the last.

At the examination it was found that upon laying open the peritoneal cavity, a small quantity of fluid faeces was found within. The intestines were extremely vascular and enormously distended with air: the coats so thinned, that in places they were not thicker than tissue-paper, and so extremely rotten, that they broke down under the slightest touch; in one place, before they were handled, a small rent was seen in the ileum about a foot above the valve. A hard mass of faeces was found wedged into the valve, which could only be displaced by considerable force: it was about the size of a hen's egg. Immediately beyond the caecum was a small pendulous polypus, the size of the tip of the little finger, attached to the mucous membrane. The rest of the gut was natural.

Martha D., *æt.* 21, was admitted on the 22d of November with the following history. She had suffered at the age of twelve years from an attack of constipation, accompanied with much vomiting (not faecal) and much pain in the right iliac region. She was ill for one week, when the symptoms subsided, but left a proneness to constipation; the bowels only acting once in two days, and then with difficulty. She had been compelled frequently to resort to the aid of purgatives. With this exception she had been in perfect health since that attack up to the 16th of November, when she was seized with severe and sudden pain in the right iliac fossa. The bowels had been previously confined; severe vomiting followed immediately on the first day of illness. On the 19th of November there was a slight action of the bowels, but the vomiting continued; there had been no diarrhoea. On admission she had all the appearance of a patient suffering from bowel mischief: she was flushed, anxious, and worn; there was dull percussion in the right iliac fossa, midway between the navel and the brim of the pelvis, with tympanitic and distended intestines in the neighbourhood. She was vomiting, but not stercoraceous matter. The following day the vomiting had increased, and was decidedly faecal. She was ordered one grain of opium every six hours, which gave much relief; the sickness stopped; there was much less anxiety; she became more cheerful, and her eyes and face became more natural in appearance. Still the bowels were not moved, and the abdomen was more distended; she passed plenty of urine from the first, and no albumen was detected. Faecal vomiting returned on the 29th; and on the 1st she suddenly became collapsed, and died.

At the examination it was found that the intestines were smeared

over with a layer of creamy pus, and were very slightly adherent to one another; while here and there were one or two patches of most intense congestion; and in these places it was found that the small intestine was the seat of ulceration. One of these ulcerations had extended so far, that a minute perforation had taken place, through which fecal matter had escaped into the peritoneal cavity. The small intestine was enormously distended; and about four feet above the ilio-cæcal valve was attached to the mucous membrane a number of lobulated polypoid growths, with long, thin, semi-transparent pedicles. About one foot above the ilio-cæcal valve was found a large intussuscepted portion of the intestine in a very sloughy condition.

One of the polypi had drawn after it the portion of the bowel to which it was attached, and caused the portion so dragged upon to become invaginated in the part below.

Hydatids of the Liver.

Mary Ann P., æt. 52, was admitted on the 13th of March, under Dr. Fuller. She was married, and had two children, the youngest twenty years old. Twenty-five years before admission she had noticed a tumour, which made its appearance first in the region of the gall-bladder, at the lower and middle portion of the right hypochondriac region. This had gradually increased at first; more rapidly since April 1868. She had passed joints of tapeworm. On admission she was much flushed; the belly was very much distended, and measured fifty-six inches and a quarter in the largest part; there was distinct fluctuation near the surface, and the fluid was evidently contained in a large cyst. It was impossible to make out any connection between this and any abdominal organ; there was no irregularity of surface, and no evidence of multiplicity of cyst. The patient suffered much from pain and tenderness of the belly; she was corpulent, and much flushed; percussion resonance was distinct in the flanks, and very dull on the anterior; the urine was albuminous, with lithates. On the 27th she was tapped, and thirty-one pints of fluid removed. On introducing the trocar no fluid at first ran out from the canula until a glutinous membrane was withdrawn. The fluid was dark greenish-yellow, s.g. 1016, opaque, and very albuminous; contained bile, crystals of hæmatoidin, plates of cholesterin, and doubtful pus, with granular flakes of a bright yellow. The canula was frequently clogged by this yellow membranous tissue, which was pulled away with the forceps. The fluid was carefully examined, but no hooklets of hydatids were discovered.

The patient became very much worse after the tapping, and suffered much from pain and tenderness in the belly, with vomiting. After the tapping, the liver was found to be enlarged, and extended downwards nearly to the level of the umbilicus, from which some substance seemed to extend downwards from the middle of the right lobe. The belly was now extremely distended and tympanitic. The cyst rapidly filled again, and in five days the fluid had reaccumulated. She sank rapidly, and died in much pain.

The following appearances were found at the post-mortem examination:

The right lung was much compressed by a large fluctuating tumour, which pushed up the diaphragm, and materially diminished the size of the thoracic cavity. The abdominal walls were of extreme thinness; and upon laying them open, an enormous fluctuating tumour presented itself, which completely filled the abdominal cavity, covering all the viscera, except in the left epigastric region, where a small portion of the gastric flexure of the colon and the stomach were visible. The tumour extended into the pelvic cavity, and was adherent to the fundus of the uterus; it was uniformly adherent to the abdominal walls and to the viscera in the abdomen by such strong adhesions, that it was impossible to separate them without rupturing the cyst; it was also adherent to the under surface of the liver, and appeared to be connected with it, passing into its substance. The liver itself was displaced, being pushed down by another tumour, which was situated between the left lobe of the liver and the under surface of the diaphragm, pushing the former down and the latter up. The two tumours and the liver were removed from the body together. The lowermost and largest tumour was found to be attached to the free margin of the left lobe, a portion of which was deficient, and the tumour had evidently sprung from this portion of liver. The whole of the upper part of the left lobe was hollowed out into a cyst, which formed a part of the uppermost tumour. These tumours or cysts did not communicate with each other. The walls of the larger tumour were exceedingly thin and soft, and very easily torn. Within the interior was a large quantity of bile-stained fluid, which was found to contain cholesterin; there were also a large number of hydatid cysts, varying in size from a hazel-nut to a cocoa-nut; some collapsed and empty, others full; some of a deep yellow colour, containing turbid matter, others of a pearly whiteness, and containing clear fluid. An abundance of hooklets was discovered. In the secondary cysts was found a quantity of reddish material like vermilion, rhomboidal crystals of hæmatoidin.

Table of Cases admitted into the Medical Wards of St. George's Hospital during the Year ending December 31st, 1869.

Nature of disease.	Total number admitted.	Total number of deaths.	Percentage of deaths.	Complicated with other diseases.	Deaths among complicated cases.	Observations.
Fevers :						
Typhus	8					
Enteric	47	9	19	4	1	One case in hospital.
Simple	20					
Scarlatina	40	4	10	2	1	Two cases relapsed.
Measles	9	1	11	1	1	
Epidemics :						
Diphtheria	3					
Mumps	1					
Blood-poisonings :						
Erysipelas	12	2	16·6	1	1	
Pyæmia	6	6	100	1	1	
Glanders	1	1	100			
Intermittents :						
Quotidian	5					
Tertian	2					
Quartan	2					
Rheumatism :						
Acute	77	3	39	45	3	Of these, seven cases had endocarditis after admission ; three, pericarditis.
Subacute	87					
Chronic	11			1		
Gonorrhœal	13					
Scarlatinal	1			1		
Syphilitic	2					
Gout	35	1	3	7	1	
Osteo-arthritis	19					
Syphilis	17					
Cancer, &c. :						
Thoracic	3	3	100			
Uterine	17	1	6			
Stomach	4	2	50	3		
Liver	2	1	50			
Abdominal	26	6	24	1	1	Amongst these are included tumours of doubtful nature.
Scrofula and Tubercle :						
Phthisis	81	16	19·7	16	3	
Glands	2					

Nature of disease.	Total number admitted.	Total number of deaths.	Percentage of deaths.	Complicated with other diseases.	Deaths among complicated cases.	Observations.
<i>Tubercle, &c.—continued.</i>						
Peritoneal . . .	7	2	28			
Laryngeal . . .	3	1	33			
Tuberculosis . . .	12	5	41·6			
Diabetes . . .	11	2	18	2		
Hæmorrhages :						
Epistaxis . . .	4	2	50	1		
Hæmoptysis . . .	7	3	42	3	2	
Hæmatemesia . . .	4					
Purpura . . .	5	1	20	1	1	
Anæmia . . .	10			2		
Cachexia . . .	8					
Starvation . . .	9	1	11	1	1	The fatal case was complicated with granular kidneys.
Dropsy :						
Anasarca . . .	40	13	32	40	32	
Ascites . . .	4	2	50	4	2	
Ovarian . . .	11	1	9	1		
Brain :						
Meningitis, &c. . .	7	4	57			
Softening . . .	2	1	50	1		
Cyst . . .	1	1	100			
Tumours (?) . . .	4					
Hæmorrhage . . .	8	2	66			
Serous . . .	1					
Hydrocephalus . . .	1					
Spinal cord :						
Softening . . .	6	2	33	1		
Tumour . . .	1	1	100			
Hæmorrhage . . .	1	1	100			
Meningitis . . .	2					
Nerves :						
Neuralgia . . .	13					
Sciatica . . .	9					
Paralysis agitans . . .	1					
Locomotor ataxy . . .	4			1		
Hemiplegia . . .	27	1	4			
Paraplegia . . .	12	3	25	1		
Local paralysis . . .	8	1	12			
Nervous system :						
Epilepsy . . .	9	1	11	1	1	Death from phthisis.
Chorea . . .	19	2	10	1		
Hysteria . . .	42					
Hypochondriasis . . .	4					
Delirium tremens . . .	16	1	6			
Insane . . .	5					
Heart :						
Pericarditis . . .	22	2	9	22		Six occurred after admission.
Valvular . . .	117	24	21	78		
Dilatation . . .	11	5	45	7	4	
Fatty . . .	4	2	50	3	2	
Blood-vessels :						
Embolism . . .	1	1	100	1	1	

Nature of disease.	Total number admitted.	Total number of deaths.	Percentage of deaths.	Complicated with other diseases.	Deaths among complicated cases.	Observations.
Blood-vessels—continued.						
Aneurysm . . .	5	1	20			
Phlebitis . . .	8	1	12·5			
Thrombosis . . .	1					
Varicose veins . . .	2	..	..	1		
Trachea, &c. :						
Laryngitis . . .	1					
Croup . . .	3	2	66	1	..	Both fatal cases were moribund on admission.
Lungs :						
Asthma . . .	2	2	100			
Emphysema . . .	16	5	31	4	4	
Bronchitis . . .	84	21	25	15	8	
Pneumonia . . .	68	16	23·5	19	7	
Pleurisy . . .	46	6	13	11	1	
Empyema . . .	4	3	75			
Pneumothorax . . .	2	2	100	2	2	
Mouth, &c. :						
Quinsy . . .	15	..	..	1		
Strict. of œsophagus	3					
Stomach :						
Ulcer . . .	1	1	100			
Dyspepsia . . .	28	..	..	1		
Intestines :						
Inflamed . . .	2					
Colic . . .	3					
Ileus . . .	6	2	33			
Constipation . . .	20					
Perforation . . .	1	1	100	1	1	
Dysentery . . .	5	1	20	1	1	
Diarrhœa . . .	10	1	10			
Disease of rectum (?)	1					
Liver :						
Inflamed . . .	1					
Congestion . . .	2					
Cirrhosis . . .	11	5	44·4	4	1	
Waxy . . .	3	2	66			
Tumours . . .	3					
Jaundice . . .	10					
Gallstones . . .	1					
Spleen :						
Enlarged . . .	2					
Peritonitis :						
Acute . . .	12					
Chronic . . .	1	1	100			
Kidneys :						
Nephritis . . .	37	10	27	28	8	
Granular . . .	47	17	36	21	10	
Waxy . . .	10	6	60	4	3	
Cyst . . .	2	1	50			
Abscess . . .	1					
Calculus . . .	3					
Hæmaturia . . .	1					

Nature of disease.	Total number admitted.	Total number of deaths.	Percentage of deaths.	Complicated with other diseases.	Deaths among complicated cases.	Observations.
Bladder :						
Inflamed	2	1	50			
Organs of generation :						
Male :						
Testicle	1					
Gonorrhœa	1					
Female :						
Ovary inflamed	2					
Abscess	1	1	100			
Cyst	1					
Uterus inflamed	9					
Tumours	5					
Displaced	2					
Pregnancy	1					
Vagina inflamed	2					
Abscess	1					
Leucorrhœa	15					
Vicarious menstr. . . .	2					
Dysmenorrhœa	2					
Amenorrhœa	4					
Menorrhagia	15					
Pelvic cellulitis	2					
Flooding	2					
Bone, &c. :						
Diseased bone	10	1	10	3	1	
Joints	3	1	33	2	1	
Periosteum	1					
Facial abscess	1					
Muscles :						
Atrophy	2	1	50			
Myalgia	1					
Skin :						
Squamous	8	1	12.5	1	1	
Exanthematous	9					
Pustular	1					
Vesicular	1					
Lupus	2					
Bronzing, &c. . . .	2	1	50			
Poisons :						
Metallic	2					
Narcotic	2					
Alcohol	6					
Prussic acid	1	1	100			
Copaiva	1					
Lead	4					
Parasites	2	2	100			

REGINALD E. THOMPSON, M.D.

Medical Registrar.

REPORT OF SURGICAL CASES

ADMITTED DURING THE YEAR ENDING DECEMBER 31ST, 1869.

THE total number of cases admitted during the year has been 2018, of which 37 were transferred to the medical wards, either from some ailment requiring the physicians' notice having supervened, or from the case presenting at first sight more the characters of a surgical disease. Twenty-nine also were received into the surgical wards from the physicians, under whose care they had been first admitted.

The number of deaths in the surgical wards was 127, 20 of whom were either brought in dead, or died within twenty-four hours of admission; making the rate of mortality 5·7 per cent, while that of the previous year was 6·7 per cent of the total number of cases admitted.

In order to cursorily review the different cases of interest that have occurred, the same classification has been observed as in previous Reports; and as many cases would otherwise come under notice in more places than one, they will only be mentioned under the injury or disease for which they were originally admitted.

Considering first the various cases of accident, we find that they number 761, against 777 admitted in 1868; the mortality being as nearly as possible the same.

Following the order of former years, we have to consider the cases of *burns* and *scalds*, which amount to 49—33 of the former, and 16 of the latter—11 of which proved fatal. These were of every degree of severity, from simple reddening of the skin to complete charring of one or more limbs. One case only was complicated, and that a slight case of burn, with crushing of two fingers, which necessitated their amputation. The patient made a good recovery. No other case in this class calls for a special notice.

INJURIES OF THE HEAD furnish in all 124 examples, 20 of which terminated fatally. The number of scalp-wounds admitted was 43, 1 terminating unfavourably, and 8 being complicated. The fatal case was that of a woman, æt. 50, who, three days before her admission, was knocked down by a cab and an extensive scalp-wound inflicted. When she was admitted there was a large sloughy wound over the left temple, with considerable puffiness around, and an erysipelatous blush over the upper part of the face. While in the Hospital she improved; the wound became healthy, and the erysipelas passed off; but on the twenty-third day symptoms of meningitis set in, and she died with convulsions

and paralysis four days later. One scalp-wound was complicated with a fractured humerus, and got well; and 6 with erysipelas (4 having it at the time of their admission), which made good recoveries.

Eighteen cases were admitted of *scalp-wounds*, in which some portion of bone was denuded of *pericranium*; 3 of these were complicated and died, and 1 was submitted to operation. This case, in which the skull was trephined, might perhaps be more strictly reviewed under the head of *compound fractures*, as it was afterwards found that a small piece of the outer table had been chipped out. The following is a brief sketch of the case:

A married woman, æt. 47, while riding the day before admission was thrown off, and struck the right side of her head. The wound was closed with sutures. On her admission, there was an extensive wound over the right temple closed with sutures; tissues around much swollen and inflamed. The wound was opened, and bone to the extent of a half-crown piece found denuded of *pericranium*, a minute speck of the outer table being depressed. For a week the wound and her general condition improved; but on the eighth day she became feverish, with sickness, pain in the head, and rapid pulse. Coma gradually came on, and on the thirteenth day she was quite insensible, with stertorous breathing; pulse 160. The trephine was applied at the seat of injury, and a crown-full removed; pus was found in the diploë and also inside the skull, the dura mater puffing up through the aperture. She continued in the same state, and died about six hours after the operation.

Both the other cases that were complicated died of suppuration in the diploë and pyæmia. The wounds in either case were extensive; but progressed most favourably till the beginning of the second week, when rigors, sweating, pain in head, white tongue, and rapid pulse came on; and death ensued in seven and nine days respectively after the supervention of the above symptoms.

The cases of *concussion* number 34, 2 being complicated, but all recovering. The period of insensibility varied from a few seconds to several days, and even in some cases, when the patients were discharged at the end of two or three months, there was still remaining somewhat of that obstinate listless manner so characteristic of the injury. In one case the injury was complicated with a fractured humerus, and in the other with a superficial scalp-wound, neither of which need detain us.

Simple fractures of the skull number 6, all of which died. The nature of the injury in every case being very severe (4 of the cases having died before they arrived at the Hospital, and the remaining 2 about three and five hours respectively after their admission), it is impossible to say whether there were not other, though not apparent, injuries.

Eight cases of *compound fracture of the skull* were admitted, 3 of which died. In all these 3 cases there was considerable smashing-in of the skull, with extensive wounding of the dura mater and brain; and in two of them the bone was found embedded in the substance of the brain, death ensuing very shortly after admission. In 3 instances the

fracture was very limited, and these all recovered without any cerebral mischief; though a severe attack of diffuse cellulitis in one (a woman, *set.* 50) placed her life at the time in considerable danger. Two cases which recovered, though the injury was very extensive and necessitated the removal of considerable portions of the skull, call for a brief notice.

A boy, *set.* 12, was thrown out of a cart, of which the horse was running away, and was supposed to have alighted with his head on the kerbstone. On admission he was insensible and collapsed, and had twitchings of the muscles of the face. There was a contused wound about one and a half inches long over the left parieto-occipital suture leading down to a large portion of depressed bone. There was also an oblique comminuted fracture of the lower third of both bones of the left leg. About half an hour after admission he was very sick and became semi-sensible; and shortly after he was put under the influence of chloroform (the face being slightly drawn to the left side), and, with the help of an elevator and a Hey's saw, fragments of bone enough to cover a crown-piece were removed, involving in the greater part both tables of the skull; the *dura mater*, however, was not noticed to be wounded. He continued only slightly conscious for about a fortnight; during the whole of the time he was very restless and noisy, with rapid pulse and considerable febrile disturbance. After this he began to improve and to recognise his friends, though by his restlessness his fractured leg became compound and considerably displaced. During the first fortnight he was treated with the morphia subcutaneously injected, frequently as much as three-quarter grain being administered in the course of twenty-four hours. At the end of three weeks he was quite rational, though excited at times, and progressing favourably; and when sent to Wimbledon at the end of eleven weeks, the wound in the head was nearly healed, as was also the leg.

F. M., *set.* 22, was in a railway accident and thrown out of the carriage, striking his head against the rails. On admission he was perfectly sensible, having walked to the Hospital. There was a lacerated wound over the anterior part of the right parietal bone about one and three-quarter inches long, at the bottom of which the skull could be felt comminuted and depressed. He was slightly put under the influence of chloroform, the wound enlarged, and about thirteen small portions of bone picked out; one sharp piece wounding a small vessel of the *dura mater*, from which there was abundant hemorrhage, but which was arrested by pressure with a pad of lint. The fracture did not seem to extend far; so the scalp was replaced and the wound closed. No unfavourable symptoms occurred after the operation; and the patient was discharged at the end of four weeks with the wound almost healed, and free from pain or giddiness.

Nine cases occurred of *fractured base of the skull*, 3 of which died. In 2 there was abundant hæmorrhage from the nose, and in 7 from the ear, followed by a clear bloody discharge. In the fatal cases the patients continued insensible till death, which took place in 1 shortly after admission, and in the other 2 on the following day. The longest period of insensibility among the cases that recovered was ten days; the others varying from a few hours to three days. In all there was

some heaviness when they left the Hospital, and 2 were readmitted with giddiness and pain in the head.

Laceration of the brain occurred in 4 cases, and in all death resulted; 1 being complicated with smashing-in of the chest-walls and wound of the lung. All died within three days of their admission.

Two cases of *simple contusion of the scalp*, which present no features of interest, close the list of injuries to the head.

In the division *INJURIES OF THE FACE* we find 38 cases; 1 only proving fatal, and that a man, æt. 32, who, twelve days before his admission into the Hospital, fell off a scaffold, and fractured his lower jaw a little to the right of the symphysis. He became an out-patient at the time of the accident, and was seen from time to time progressing favourably. On the day of his admission into the Hospital, he came up with slight hacking cough, dry tongue, and considerable febrile disturbance, stating that he was quite well till two days before, when he noticed pain in the chest and headache, never remembering to have had any rigor or sweating. He was taken taken in, and numerous moist sounds heard over both sides of the chest. These symptoms continued; and he died four days later, when numerous secondary deposits were found in either lung.

Three other cases of *fractured jaw* were under treatment, and all did well.

One case of *fractured bones of the face* came under notice in a young man, æt. 17, who, while drunk, placed a gun loaded with shot in his mouth and let it off. On admission there was a contused wound about midway between the left external angle of the orbit and the angle of the mouth; the finger could be passed through the external wound into the mouth, and the superior maxillary bone felt to be comminuted. There was great swelling of that side of the face, which, however, gradually diminished, and numerous portions of comminuted bone were picked out. When he was discharged, at the end of about seven weeks, the external wound was almost healed, and the space vacated by the superior maxilla fast filling in.

Eight cases were admitted in which there was *bruising and superficial chafing of the face*; all recovering, and being able to leave the Hospital in the course of a day or two.

Only 1 out of the 10 cases of *wounds of the face* was at all serious, and this, though it recovered, threatened at one time to implicate deeper-seated tissues. The patient, a betting-man, while in a row was stabbed by another man in the orbit with the point of an umbrella, which he described as going in a long way. On admission, immediately after the accident, there was a lacerated contused wound about one-third of an inch long at the inner margin of the left orbit, cutting through the upper lid. There was slight hæmorrhage, but the sight of that eye was unimpaired. He complained of great frontal pain, and had a full but slow pulse. Soon after his admission he vomited some blood. Ice was applied to the head, and the patient kept perfectly quiet; but for four days the headache and slow pulse continued, with repeated vomiting. After this he began to improve; and when discharged, at the end

of three weeks, there was only occasional giddiness, and the wound almost healed.

WOUNDS OF THE EYEBALL furnish 14 examples; all of which recovered, though in one instance the sight of that eye was lost. They were mostly caused by portions of stone and marble being chipped off while at work.

Under the head INJURIES OF THE BACK there were 37 cases admitted, 2 terminating fatally. Five cases are entered as fractured spine, though in 2 instances it was merely a portion of one of the spinous processes being chipped off that constituted the fracture. In 2 cases the seat of fracture was in the lower dorsal region, one patient partially recovering; the other died, after lingering on in the Hospital over six months, with bedsores and chronic cystitis. In the other fatal case, the seat of mischief was in the upper cervical region, and the patient only lived two days. The remaining injuries of the back comprise 29 *sprains and contusions*, and 3 *wounds*, none of which call for any record.

INJURIES OF THE NECK furnish us with 11 examples, 10 of which were wounds, and 1 a contusion. Out of the 10 wounds of the neck, 9 were suicidal, and 3 died; and 1 of a trivial nature, caused by a spike while a boy was climbing over the railings. In one of the fatal cases bronchitis was the cause of death; and in the other 2 cases (both over 50), exhaustion and sloughing of the edges of the wound.

Thirty-four cases of INJURY TO THE CHEST were admitted, of which 9 terminated fatally. Of this number, 21 were *fractured ribs*, which were complicated in 11 instances (with other injury in 7, and with bronchitis in 4).

A man, *æt.* 25, was admitted with fractured ribs and a contused wound of the forearm. As far as the ribs were concerned he did well; but died of diffuse cellulitis and pyæmia consequent on the wound of the forearm.

Three cases of *fractured ribs* died shortly after admission, in all there being severe other lesions; in one rupture of the liver, in another wound of the lung and hæmorrhage, and in the third fractured skull and wound of the lungs. The 2 remaining fatal cases were complicated with fracture of the pelvis and fracture of the leg, and empyæma.

Contusions of the chest furnish 9 examples; 1 only, and that an old woman, being complicated with bronchitis; she, however, made a good recovery, as did the others.

One case of *superficial wounding of the thoracic parietes* recovered in a few days, without any serious symptoms.

The last kind of injury in this division is *wound of the lung*, of which 3 cases were admitted, all of which were complicated with other severe injuries. Two died soon after admission, collapsed from the extent of the accident; and the third of pneumonia about five days after his admission.

INJURIES OF THE ABDOMEN furnish 19 cases to our list of injuries, and 6 to our number of deaths. Only 1 out of the 8 cases of *contusion* calls for any comment; viz. a man, *æt.* 40, was kicked in the abdomen by a horse the day before admission into the Hospital. When admitted there

was bruising of the abdominal wall, with some collapse, and great pain in the belly. Vomiting set in, and great distension and tenderness of the abdomen; his pulse was rapid and small, and his expression sunken. He died on the third day of peritonitis.

Two cases of *wounds of the scrotum* and 2 of the *labia* occurred, but none were of a serious nature. Three cases died shortly after their admission with ruptured viscus, one being complicated with fractured ribs; the liver was the seat of lesion in 2, and the kidney in the third. In 3 cases the pelvis was the seat of fracture; one of which died, having also fractured ribs, and has been previously noted. The two other cases of fracture simply involved a small portion of the crest of the ilium, and speedily recovered.

The remaining case in this division was that of a man, æt. 60, who fell off a ladder about 12 feet high across the edge of a tub. On admission, shortly after the accident, he was somewhat collapsed, unable to pass any urine, and suffering great pain in the perinæum. There was considerable extravasation of blood in the cellular tissue of the scrotum and bleeding from the urethra. An attempt was made to introduce a catheter into the bladder, but without success; so perineal section was performed, and the urethra found torn across; a gum catheter was passed into the bladder from the wound, and tied in. Rigors and sweating set in on the second day and continued; and he died early on the seventh day, when his kidneys were also found extensively granular.

Having passed through the various regions of the body associated with the different injuries, we come to the extremities. And first, with regard to the UPPER EXTREMITY, we find a total of 63 injuries, of which only 4 proved fatal. Nine cases of *contusion* are recorded, one being complicated with a fractured clavicle, and none of a severe nature.

Wounding of the arm occurred in 4 instances, one happening in a woman, æt. 27. The wound was about four inches long and on the inner side of the elbow, injuring the ulnar nerve, so as to cause loss of sensation in the parts supplied by that nerve. About the third day sensation began to be reëstablished; and when the patient was discharged from the Hospital with the wound almost healed, at the end of fifteen days, sensation was almost perfect.

Another case of wound of the arm was that of a boy, æt. 16, who was reported to have had a large shot from a pistol lodged in his arm. When admitted there was only one small wound in the front of the arm. No shot could be felt; and at the end of a week the wound was almost healed.

Three cases of *wounds of the forearm*, of which 1 died of pyæmia and diffuse cellulitis, were admitted; the other 2 soon recovered, in 1 the radial artery being divided.

Of the 4 *wounds of the hands* that were taken into the Hospital, one was complicated with tetanus, and died. Mary M., æt. 8, was running along, and fell, cutting her right hand with a piece of glass. On admission there was a wound about half an inch long on the palmar aspect of the right hand, over the course of the median nerve. There was profuse hæmorrhage, which was stopped by pressure and well raising the

hand. On the ninth day the wound was almost healed, and she was to have left the Hospital; but being somewhat feverish and low-spirited that morning, she was recommended to stay in. The following morning there was rigidity about the masseter muscles; the mouth could not be opened above half an inch; there was slight risus sardonicus, and difficulty in deglutition; pulse 120, tongue furred. The muscles of the back and neck became involved, and the other symptoms were aggravated. Turpentine, belladonna, and the subcutaneous injection of morphia, as well as the application of ice to the spine, were resorted to; but without any beneficial results. As the symptoms increased in severity, and the hand became clenched and flexed on the forearm, about a sixth of an inch of the median nerve was dissected out as a last resource, but without any good effect; and she died the next day, ten days after the symptoms first set in.

THE FRACTURES OF THE UPPER EXTREMITY number 29, of which 1 died, and 1 was submitted to operation. They comprise 6 of the *clavicle*, 16 of the *humerus*, 1 of the *neck of the humerus*, 5 of the *forearm*, and 1 of the *olecranon*. The bulk were treated on the ordinary principles, and call for no particular notice: two, however, call for a few remarks. A little girl, *set.* 6, while playing in and out a wagon, fell off on to the right elbow, about six months before she came to the Hospital. On admission the arm was extended at rather more than a right angle. The olecranon was dislocated backwards, and the inner condyle of the humerus could be felt very prominent and out of its place, preventing flexion or extension of the forearm beyond a very limited degree. The head of the radius appeared to be quite free. As, after a careful examination under chloroform, it was found that no more motion could be obtained, owing to the displacement of the internal condyle, an incision was made at the back of the elbow, and about three-quarters of an inch of the lower end of the humerus, together with the olecranon, were removed. The radius was not interfered with, and the periosteum covering the lower end of the humerus was in great part dissected back from the bone that was removed, and left. The limb was placed on an angular splint for about three weeks; and when discharged, about eleven weeks after the operation, the wound was almost healed, and there was slight flexion and extension. On examining the end of the bone, there was found to have been a fracture between the condyles into the joint, and that the inner condyle had been completely separated, and united about half an inch below its proper level.

The only other case of *fracture* that calls for notice is that of a man, *set.* 40, who two months before his admission received a fracture of both bones of the left forearm, and this more on account of its being a fatal case after the administration of chloroform than from the nature of the injury. On admission there had been a fracture of both bones of the left forearm about the middle. The hand was considerably pronated, and the upper and lower fragments, though united, were in anything but the same straight line. There was also slight bronchitis. As it was thought advisable to attempt to place the fragments in better position, chloroform was given; and though it was administered in the

usual way with Snow's inhaler, and with every care, the patient's pulse suddenly stopped, and about fifteen seconds later the breathing, just at the moment when he was becoming insensible. Every effort was made to restore animation, in the way of artificial respiration, galvanism, &c., which were kept on with for about three-quarters of an hour; but the patient never showed signs of life again.

COMPOUND FRACTURES OF THE UPPER EXTREMITY number 18, 1 of which died of pyæmia after extensive diffuse cellulitis of the hand and forearm. In 1 the seat of injury was the arm, in 2 the forearm, and in 10 some portion of the hand; 9 cases occurring in which amputation was imperative. All except the one afore-mentioned recovered; and as they are enumerated in the list of Compound Fractures in another part of the Report, need not be dwelt upon here. The only other cases under this head were 1 of dislocation of the humerus and 1 of dislocation of the elbow, both of which were reduced and did well.

We now come to the last of our divisions, namely, that of INJURIES TO THE LOWER EXTREMITY. This comprises about half the total number of injuries admitted, and has only a mortality of 14, or about 3·7 per cent. Though the number of admissions in this class is so large, it does not necessarily imply that they were relatively so severe, but rather that, necessitating rest (which in the case of the lower extremity can only be obtained by confinement to bed), they were unable to be treated as out-patients. The total number of this class of accidents numbers 386, and comprises contusions, wounds, fractures, dislocations, &c.

Considering them in a similar order to the injuries of the upper extremity, we have, first, *contusions*, which furnish us with 81 examples; none being of a serious nature, and all were discharged well after a short rest. Wounds of the lower extremity include 17 of the *thigh*, 13 of the *leg*, 2 of the *foot*, and 3 implicating *joints*. Of the 17 wounds of the thigh, none were of an extensive or serious nature; 3 were in the neighbourhood of the knee, but were quite superficial and soon healed; and one a spike-wound, caused by a boy climbing over some railings, was inflicted in the course of the femoral vessels, but being quite superficial was healed when he was discharged at the end of a week.

One case of wound of the leg, caused by an adze while the man was at work, was complicated with inflamed absorbents and considerable constitutional disturbance, but ultimately recovered. In the other cases the wounds were trivial, and the patients were soon in a state to leave the Hospital. Three cases were admitted in which the wound implicated the knee-joint. A man, æt. 46, a tailor by trade, three days before admission ran a needle into the right knee, which was taken out; but, against all advice, he refused to stay in the Hospital. The next day the knee became swollen and painful; and as the pain and swelling continued to increase, he came up on the fourth day, and consented to remain in the Hospital. On admission the right knee was swollen, red, and acutely painful. There was considerable effusion into the joint, and on the inner side, a little above the patella, there was a small wound, through which thin pus exuded; there was repeated starting of

the limb, with rapid pulse and foul brown tongue. The redness increased and spread up the thigh; his condition became hectic; and despite of the free use of opium, and as much support and stimulants as his condition would bear, he sank four days after admission. In the 2 other cases there were small punctured wounds, which were closed by pads of lint; and though there was considerable swelling and heat about the joints for a few days, it subsided, and the patients made good recoveries.

FRACTURES come next for our consideration. And first of those implicating the *thigh bone* there were 55 examples—11 of the neck of the bone, of which 1 died; and 44 of some portion of the shaft, which terminated fatally in 2 instances. In all the cases of fracture of the neck of the femur the injury was situated within the capsule, and occurred in patients whose ages varied from 50 to 81 years. One woman, æt. 75, died twelve days after the receipt of the injury, of exhaustion.

Two cases in which the *shaft of the femur* was fractured, and which terminated in death, occurred in patients whose ages were respectively 98 and 60 years. In the first case, the old man was unable to bear the pressure of the splints, and the fracture became consequently compound; he died about fifteen weeks after the accident, and the union was found complete and firm. In the other case, the man, who was subject to fits and quite childish, was admitted a fortnight after the accident in an extremely low condition, with a large sloughy bed sore and congestive pneumonia; he died on the fourth day after his admission. The remaining cases of fractured femur all recovered, being treated in almost every case with the long thigh-splint.

Fracture of the tibia occurred in 14 instances, and *fracture of the fibula* in 26, all of which recovered; one of the latter injury being complicated with an attack of erysipelas of the face.

Thirteen cases of *fracture of the patella* were admitted, 1 only being caused by direct violence. One man, æt. 37, was admitted with a transverse fracture of the right patella, who had been in the Hospital about three years before with a similar fracture of the same patella, and also in St. Bartholomew's Hospital with a fracture of the left patella. The lesion this time was parallel to and about one-third of an inch above the previous fracture, which remained firmly and closely united.

Fractures of the leg number 60 cases, 1 of which died with fractured ribs and empyæma. In 2 other instances the injury was complicated, and in 3 it was found necessary to divide the tendo Achillis before the fragments could be brought into proper position.

In 4 instances the *bones of the feet* were the seat of fracture, but none call for any particular notice.

Seventeen cases of *compound fracture* were admitted; 7 being submitted to operation, and 9 dying. As these are tabulated in another part of the Report with similar injuries of the upper extremity, we may pass on to the consideration of the *dislocations*, of which 5 came under notice. A man, æt. 43, had been struck over the right hip eight months before admission, and the head of the femur dislocated. He was put under the influence of chloroform and reduction attempted, but without

success, and he was discharged in the same state. The patella was dislocated on to the external condyle in a girl, æt. 18, who, while reaching to get a small barrel of water off a shelf, let it fall on to her left knee. The dislocation was easily reduced, and the patient made a good recovery.

A boy, æt. 15, while running across the road was knocked down by a cart, and twisted his right knee. When admitted, immediately after the accident, the head of the tibia was resting on the external condyle, with the leg and foot rotated outwards. Extension was made, and the head of the tibia slipped into its place without difficulty. The limb was placed on a ham-splint, and though a good deal of effusion into the joint ensued, it subsided; and he was discharged at the end of four weeks, with leather splints on.

One case was admitted with dislocation of the internal cuneiform bone, caused by a horse falling over on to the man's foot. No impairment to the use of the foot resulted, though it could not be reduced into its place; and the man was transferred into the medical wards with scarlatina, which came on while he was in the Hospital. The remaining dislocation was that of the second phalange of the big toe, which was reduced without difficulty.

The only cases left to conclude our list of injuries are those of *sprains*, of which 75 were admitted; 3 of the hip, 18 of the knee, and 54 of the ankle. Rest and the application of Goulard lotion alone were necessary to enable the patients to leave the Hospital after a short sojourn.

Having briefly reviewed the various accidents admitted into the Hospital, we have next to consider the several diseases which came under notice. Assuming the same classification as in last year's Report, into GENERAL DISEASES and those of the various ORGANS, we will consider the general diseases first, which comprise in all 91 examples, 35 of which died. This section must necessarily be incomplete, as in almost every instance the general disease was only secondary to some injury or local disease for which the patient was first admitted, and therefore the notices of the cases will be found scattered in the various other sections.

Erysipelas, which stands first on the list, numbers 27 cases, 3 of which died; and only 9 out of 27 cases were uncomplicated, in 5 instances setting in after operations. Out of the whole number of cases, only 9 broke out in the Hospital, the remainder being admitted with the disease. The fatal cases occurred in every instance in enfeebled persons over fifty years of age.

Twelve examples of diffuse *cellulitis* came to notice, only 4 taking origin within the Hospital, and death ensuing in 4 instances.

A man, æt. 63, of a broken-down constitution, was admitted in a most precarious state, with the whole of the right leg in a state of diffuse inflammation; extensive sloughing followed, and as a last chance amputation of the thigh was performed; but the patient sank four days after the operation. The other cases will be found in other parts of the report.

Sloughing furnishes 15 cases to our list and 4 deaths, of which 1

followed a crushing-up of the foot and amputation in a boy aged 11. In two instances the patients were over 70; and in the fourth case, that of a child neglected and half starved, the age was two years. In one instance which recovered, the man was 80 years of age, losing the whole fore-part of his right foot by sloughing. The stump was almost healed when he left the Hospital. In only 6 instances phagedæna occurred, with its sharp-cut and everted margin of ulceration; none proved fatal, and the ulceration soon ceased to spread after their admission into the Hospital. No wound in the Hospital took on this unhealthy form of ulceration.

One case of *tetanus* occurred (see Wounds of the Hand), and terminated fatally.

Pyæmia occurred in 23 instances, all of which proved fatal. In 14 the mischief came on after an operation in the Hospital; and in the remainder there was a complication of some other disease or injury, in several cases the pyæmic symptoms existing at the time of admission.

One case of *gout* was admitted into the surgical wards and transferred to the physicians; and in 2 instances *measles*, and in 4 *scarlatina*, broke out while the patients were under treatment for other mischief. Six cases of *rheumatism* were also sent to the medical wards.

DISEASES OF THE ORGANS OF MOTION comprise a large class, numbering 374, 19 of which terminated fatally. For the convenience of description, they will be considered as they affect the *bones*, the *joints*, and the *appendages of joints*. Firstly, as affecting bones, we find 1 case of *acute osteitis* occurring in a boy, æt. 18, who six days before he came to the Hospital struck himself while at work over the upper part of the tibia with a mallet. The leg and knee became swollen and acutely tender; so he came up and was taken into the Hospital. On admission the upper part of the right leg and knee were much swollen, inflamed, and tender, with considerable effusion into the joint, and shooting and jumping of the limb. There was a dry furred tongue and rapid pulse, with great heat of skin and sunken expression; slight hacking cough, with rusty expectoration. Abscess threatened over the head of the tibia, and an incision made, which for a time gave relief; but fresh abscesses formed both around and within the joint, and constitutional symptoms became aggravated; so, as a last resource, the limb was removed through the lower third of the thigh; but the patient sank seven days after the operation, with secondary deposits in the lungs. The head of the tibia was found on examination to be infiltrated with pus, and the joint completely disorganised.

Three cases of *abscess of bone* are recorded, the tibia being the seat of mischief in all. One case, a boy, æt. 17, where the head of the tibia was affected, was submitted to operation, and did well. The others were chronic, and were not interfered with.

Necrosis furnishes 42 examples, 26 requiring operative interference, and only 1 terminating fatally; in a man, æt. 45, who had been in the Hospital several times with extensive specific disease of the skull. The greater portion of the vault of the skull was necrosed; and in order to

facilitate the application of sulphuric acid, which had been the means of removing a large portion of the bone, a bridge of the scalp was divided, and the dura mater, which was exposed, got wounded, arachnitis set in, and the patient died five days after the operation. In 2 cases, in which portions of the tibia had been removed, erysipelas attacked the wound; but in both instances the patients recovered. The remaining cases of necrosis, in which the bulk affected the tibia, need no special notice.

Caries of bone occurred in 46 instances, none proving fatal. In 2 cases, however, it was necessary to excise the ankle-joint, and in 2 others to remove one of the tarsal bones.

A boy, *æt.* 18, was admitted with sinuses and great thickening about the ankle-joint, and inability to use the left ankle or put that foot to the ground. The mischief had existed for two years; and three months ago an abscess formed, and had been discharging ever since. Under chloroform the joint was examined and found to be destroyed, and the astragalus considerably softened and diseased; excision was therefore performed, the whole astragalus being removed, as well as about three-quarters of an inch of the lower part of the tibia and fibula, by incisions on either side of the ankle. The case did remarkably well; and when discharged at the end of about three months and a half, the wounds were almost healed, and the patient able to get about well with a boot on and the help of a stick. The other case in which excision of the ankle was resorted to was that of a boy, *æt.* 16, who, twelve months before admission, sprained his right ankle. It continued weak and painful ever afterwards. Three months ago an abscess formed and burst, and since then the foot had been useless. When, soon after his admission, an examination was made under chloroform, the joint was found destroyed and crepitus easily detected; so the parts were excised as in the former case, but here only the upper surface of the astragalus was removed. This case also made a good recovery; and when he left the Hospital (about two months after the operation), the joint was reported as consolidated, and the wounds almost healed.

A girl, *æt.* 22, who had been frequently in the Hospital before, and had undergone excision of the elbow, and subsequently amputation of the arm, was again admitted with tenderness and constant pain in the stump. As everything had been tried to relieve this pain which medicine or operative interference could suggest (see previous Reports), it was decided to remove the remaining portion of the humerus. This was accordingly done, and the interior of the end of the bone found soft and carious; the pain, however, had gone; and though seen about six months after the operation with a long fleshy stump and considerable lateral curvature, the pain described as previously existing had entirely ceased.

One of the cases of excision of a tarsal bone occurred in a girl, *æt.* 18, who for ten years had had mischief in the left heel. When admitted there was great thickening, and the os calcis could be felt soft and carious; diseased bone had been previously removed by gouging. The bone was so extensively implicated, that excision of the whole bone was resorted to by a rectangular incision of the outer side of the heel. The

case did very well; and when she was discharged, about six weeks after the operation, the wounds were nearly healed. In the other case the cuboid and both the two outer metatarsal bones were removed in either foot. Burrowing of matter prolonged the recovery of this patient, a woman, *æt.* 45; but at last she was discharged with the wounds almost healed.

Amputation was necessitated in two instances of caries, one of the leg, and one of the forearm (see List of Operations); and in five other instances carious bone was removed by the gouge.

Forty-two cases of *disease of the spine* were admitted, in every variety of situation, and more or less advanced. In 6 death ensued: 4 being from exhaustion consequent on the profuse purulent discharge and from bed-sores; the 5th from scarlatina; and the 6th from aneurysm, formed by ulceration of the coats of the aorta into the sac of the abscess, which occurred in a man, *æt.* 34, who had been suffering from disease of the spine about two years. In 3 cases there was complication with other disease, bronchitis in one instance, phthisis in another, and erysipelas of the face in a third; but all recovered sufficiently to leave the Hospital.

Tumours of bone furnish 11 examples, 7 of which were submitted to operation, 2 resulting in death. A man, *æt.* 47, was admitted with a large malignant tumour in connection with the back of the right scapula of nine months' growth. It was increasing very rapidly in size, and was fast pulling him down. On two occasions there was abundant hæmorrhage, from the skin giving way; and though the patient was suffering from a slight attack of bronchitis, it was thought inadvisable to wait any longer. Having been put under the influence of chloroform, he was placed over on his left side, and two elliptical incisions about eight inches long made over the tumour, enclosing about three inches breadth of skin (including the part that had given way). The skin was now dissected off the tumour without cutting into it, together with the trapezius that covered it; the shoulder-joint opened, and the acromial end of the clavicle cut through with Pollock's pliers. The various attachments of the scapula in this part having been cut through, and the scapula with the growth turned forcibly backwards, the remaining attachments were divided; and by this the whole of the mass was enucleated, together with the entire scapula and the acromial end of the clavicle. The vessels were secured with silk ligatures as they were cut through, and the flaps of skin brought into apposition with silver sutures. But little blood was lost during the operation; but afterwards the bronchitis became aggravated (no doubt in part by the chloroform), and the patient died on the fifth day after the operation, little or no reparative action having taken place in the wound.

Two cases were admitted of *myeloid disease*, both situated in the head of the tibia. Amputation was resorted to—in the first case through the lower third of the thigh, and the man died of pyæmia; in the second, through the knee-joint, the patella being left in the stump. The patient made a good recovery, with an excellent stump (see List of Operations).

Two cases of *epulis* were admitted and operated on; in one a portion of the alveolar ridge was also removed.

The remaining tumours in connection with bone comprise 1 *cyst of*

the lower jaw, and 1 *exostosis of the great toe*, which were both removed; 1 *exostosis of the femur*, which, as it was no inconvenience, was not interfered with; two malignant growths in connection with the *spine*, and one in connection with the *ribs*, none of which admitted of operative interference.

Two cases of *ricketts* and 13 of *periostitis* conclude our list so far as the diseases of bone are concerned. On the former there are no remarks to make; of the latter, one or two call for a brief notice. A girl, *æt.* 8, was perfectly well till four days before her admission, when she was seized with rigors, and pain and swelling of the front of the right leg. Her parents could not in any way account for her illness; but as the symptoms increased in severity, she was brought to the Hospital and taken in. On admission there was redness and swelling of the front of the right leg, with acute tenderness, pulse, rapid and weak, tongue dry, condition hectic; so a free incision was made down to the bone, and pus let out. She improved a little after this, but the next day there was effusion beneath the periosteum of the right radius. Erratic redness subsequently appeared over various parts of the body and limbs, and the patient became lower. Ten days after admission fresh rigors set in; and she rapidly sank, and died twenty days after coming to the Hospital, with secondary mischief in the lungs. This case ought perhaps to have been considered under the head 'pyæmia,' as the periostitis was the result of blood-poisoning, and not the cause of the secondary mischief.

One case of periostitis and abscess was attacked while in the Hospital with measles, for which he was transferred to the physicians, who when they had done with him sent him back; and he made a good recovery, no exfoliation of bone taking place.

The first in the list of diseases affecting the joints is *synovitis*, of which there were 38 examples; one case only, a girl, *æt.* 9, being complicated, and that with scarlatina, of which she recovered. In all cases the striking benefit of absolute rest to the joint was to be noted; and this in many cases was of itself alone sufficient to make a perfect cure.

Ulceration of the cartilages furnish 21 cases; 9 being submitted to operation, and 8 terminating fatally. Five are entered as being complicated—3 with pyæmia, 1 with meningitis, and 1 with phimosia. The case in which meningitis occurred was that of a strumous boy, *æt.* 9, who was admitted with ulceration of the cartilages of the knee: excision of the joint was contemplated; but a few days before the operation was to have been performed symptoms of meningitis set in, and he died about a fortnight later.

The cases in which operations were performed will be found in the List of Operations, and therefore need not detain us here; so we pass on to the consideration of the cases of *abscess in joints*. Twenty-one cases of this nature were admitted, of which 8 proved fatal; 12 undergoing operations. A boy, *æt.* 17, was admitted with abscess in the left knee-joint, and a tendency to phthisis. It was proposed to remove the limb, but the friends were for a long time unwilling to submit to it; and when their consent was obtained, he was so reduced in health that it was deemed inadvisable to interfere, and he died shortly after of pyæmia.

A ploughman, æt. 21, was admitted with abscess of the right knee and hip joints; but soon after admission he was attacked with erysipelas, which for a long time rendered him in an unfit state for operation. His condition improved somewhat, and in the beginning of 1870 amputation at the hip-joint was performed, and he died of pyæmia; but as this case will be noted in the next report, it will not be detailed here. The other cases of interest will be found in the List of Operations.

Two cases of *rheumatic joints*, which were considerably benefited in the Hospital, and 3 of ankylosis of old standing, in which there was nothing to be done, bring us to the consideration of diseases of the *hip-joint*, of which 60 cases came under notice. In most instances the patients were children under 14 years of age, though in a few the patients were grown up. In 3 instances the joint was excised with success; but in 1, a sickly child, æt. 5, the head of the femur was removed, and he died the following day from the shock of the operation. One girl, æt. 8, also died of scarlatina, which broke out while under treatment in the surgical wards. The remaining cases were much benefited by rest, the application of the long thigh-splint, and good food, which in a few instances, where the mischief was in a very early stage, seemed to restore the joint to a healthy state.

One case of *loose cartilage* occurred in a young woman, æt. 25, who was admitted with considerable effusion into the knee-joint and a small lump at the inner side of the knee, which appeared to be a loose cartilage. The history given was quite that of a loose cartilage. The joint was kept at rest on a ham-splint, and blisters and iodine applied to diminish the effusion. This was effected, but not without causing also superficial abscesses to form, which were opened and healed; so that when the patient left the Hospital, after about six months' sojourn, the lump was gone, and nothing wrong about the joint detected, except slight stiffness.

The remaining cases in this division will be found enumerated in another part of the Report, but, presenting no points of interest, need not detain us here.

DISEASES OF THE ORGANS OF CIRCULATION number 71 examples, 5 of which terminated fatally. In 3 instances the *heart* itself was the seat of mischief, and all proved fatal. Fatty degeneration was the nature of the disease, 1 case of which has been noticed under injuries of the upper extremity. A case of umbilical hernia that was operated on was also the subject of fatty heart; and in a case of diseased hip, which was transferred to the physicians, under whose care she died, the heart was also found fatty.

Aneurysm furnishes 4 cases, 2 of which died. One of the fatal cases was complicated with disease of the spine, and will be found noted under that head. The other fatal case was submitted to operation, and deserves some short record. An old soldier, æt. 40, while serving in New Zealand five years ago, was wounded in the right side of the neck. Abscesses repeatedly formed and burst, and four years ago he was discharged from the army. Shortly after, the wound healed, and has continued healed. He was never very strong since the accident, but had no definite

ailment. Three days before his admission into the Hospital he noticed a beating swelling in the right side of the neck, about the size of a cob-nut, which gradually increased. On admission there was an aneurysm of the right common carotid at the upper part—the whole of the tissues of that side of the neck replaced by a hard cicatrix, so that it was impossible to define the different structures. As the cicatrix over the aneurysm became thinner and thinner every day, so that rupture of the sac was imminent, the common carotid was tied just below the aneurysm on the ninth day with a silk ligature, and the pulsation in the tumour ceased. The skin over the tumour gave way subsequently, and there was slight oozing of blood twice, and rather formidable hæmorrhage on one occasion, which necessitated plugging the cavity. As far as the wound was concerned, all progressed favourably—the ligature separating on the 15th day, and the wound healing shortly after. After the operation, however, a low form of inflammation of the lungs, which was followed by the passing of intensely smoke-coloured urine and constant sickness, with evident mischief in the liver, set in, and he died six weeks after the operation; but unfortunately no post-mortem examination was allowed. The two other cases of aneurysm were discharged much improved. The mischief in both cases affected the subclavian artery, and in both was in a very incipient state, and call for no special notice.

Three cases of *nævus* came under notice. One, a small *nævus* of the under surface of the upper lip, was transfixed with pins and ligatured; the patient, a child, *æt.* 4 months, being discharged cured. A child, *æt.* 9 months, was admitted with a large rapidly increasing *nævus* of the scalp. Setons saturated with perchloride of iron were introduced three times, but without any benefit resulting; and the child left the Hospital unbenefited, the mother being unwilling to submit it to farther treatment. The third case was that of a young woman, *æt.* 20, who was admitted with a *nævus* of the cheek; but as it was not increasing in size, and to a great extent consolidated, it was thought best not to interfere.

Hæmorrhage occurred in 4 instances, all of which were trivial, and need no comment.

Sixteen cases of varicose veins, 8 being successfully operated on, and 2 of phlebitis, none of which died, conclude our list so far as the blood-vessels are concerned.

Inflamed absorbents furnish 17, and suppurating glands 19 examples, which, together with 1 case of *tabes mesenterica*, which was discharged improved, and 2 of tumour in connection with the parotid gland, which were removed with success, bring us to the consideration of the DISEASES OF RESPIRATION.

One case is entered as *disease of the larynx*, occurring in a woman, *æt.* 28, who had been in the Hospital several times before with specific ulceration about the palate. Two months ago the throat again began to ulcerate. When admitted she was in a miserable state of health, with extensive ulceration about palate, and hoarseness. The day after her admission she apparently fainted, became somewhat livid, and died at once.

Eight cases of bronchitis and 3 deaths, and 6 cases of pneumonia with 5 deaths, came under notice; but inasmuch as these diseases were

only secondary to the mischief for which the patients originally entered the Hospital, they will be found noticed under the various divisions in other parts of the Report.

Phthisis furnishes 7 cases, there being only 1 death and 3 complications. The fatal case was that of a man advanced in years, who was admitted with fistula in ano and phthisis. He was sinking when he came in, and died about four days later. Four of the cases were admitted with no complication, and all were much benefited.

One case of *whooping-cough* in a little boy, *æt.* 5, was admitted, with the history of having swallowed boiling water; but the nature of the mischief soon became manifest, and he was discharged well. The only two remaining cases are of *empyema*; one of which, occurring after accident, has been noticed under injuries of the lower extremity and elsewhere. The other, complicated with advanced phthisis, was but little benefited by his stay in the Hospital.

DISEASES OF THE NERVOUS SYSTEM add 35 cases, of which 6 terminated fatally.

Seven cases are recorded of *meningitis*, with 4 deaths. Three, being subacute after injury, were cured by perfect quiet and treatment in the Hospital. The 4 which present points of interest will be found under injuries of the head and diseases of the organs of motion, and in the List of Operations on the head.

Paralysis furnishes 9 cases, with 1 death in an old man who was attacked with a low form of pneumonia, and died shortly after his admission into the Hospital. In 5 other cases, in which it was general, the patients were transferred to the physicians; and 1, which was partial, calls for a few remarks. The patient, a healthy man, *æt.* 41, fell on to his left forearm eighteen months before coming to the Hospital, and ever since his hand had been utterly useless, as he had not the least power of moving it. On examination there had evidently been a fracture of both bones of the forearm, which had united apparently well; and there was nothing to account for this paralysis of the extensor tendons. But as the patient had undergone various modes of treatment, he was unwilling to have the limb on any longer; so it was removed; and the patient recovered (see List of Operations). When treated with galvanism before the amputation, the extensor tendons contracted. A careful examination of the part was made after its removal, but nothing to account for the paralysis was found.

Sciatica furnishes 3 cases, and *hysteria* 13, none of which call for any notice here.

One case of *neuroma of the ulnar nerve* was admitted, in a girl, *æt.* 17 years. It had been growing for four years, and caused her no inconvenience, save a tingling pain at times down the arm to the little finger. As it was increasing but very slowly, and causing her so little inconvenience, it was deemed prudent to let it alone.

The only remaining case in this division was one of *apoplexy*, occurring in a man, *æt.* 56, who was brought to the Hospital dead, without any history. There were no external marks of injury; but a post-mortem examination revealed the nature of the mischief.

DISEASES OF THE SKIN AND APPENDAGES number 221, with a mortality of 4, 7 of the cases being complicated. Of the various kinds of skin-diseases there were 44 examples; comprising 23 of *eczema*, 4 of *rupia*, 3 of *psoriasis*, 1 of *lichen*, 3 of *lepra*, 3 of *lupus*, 2 of *scabies*, and 5 of *erythema*. In one case of *eczema*, occurring in an old man, set. 77 years, gangrene of the toes set in, which, spreading over the foot, terminated fatally about four days after its first appearance. No other case was complicated, and all recovered.

Sixty-seven cases of *ulcers* were admitted, most of a very chronic nature, and in many instances complicated with a varicose condition of the veins. None present any points of interest, 2 being complicated with *erysipelas*.

Abscesses of a superficial nature bring under our notice 55 cases, 2 of which call for a short review. A married woman, set. 34, was admitted with a large abscess over the front of the right leg. This was opened, and a large amount of pus let out; and she progressed favourably for about a week, when sickness, occasional at first, but afterwards becoming more constant, set in (she being about five months pregnant). This continued for about a month, when suddenly a hard lump the size of a flattened orange was felt at the umbilicus which had not been noticed before. Ice was applied, and the tumour decreased in size; but the sickness continued, and on the morning of the fourth day since the first appearance of the swelling the vomiting became stercoraceous; so it was deemed expedient to cut down and see what the state of affairs really was, the pulse having become weak and rapid, the expression sunken, and the tumour somewhat smaller. Chloroform having been administered, the hernia was cut down upon and the sac opened, and was found to contain a mass of omentum the size of a fist, very slightly congested, and a small knuckle of intestine very congested, with patches of lymph under its serous covering. A constriction was felt in the abdominal walls, which was divided and the whole mass put back, when some feces were seen. The gut was fished out, and a very small ulcer was found perforating its walls; so it was stitched to the edges of the wound, and the opening enlarged, so as to form an artificial anus. The patient, however, sank, and died about eight hours after the operation (see also List of Operations on the abdomen).

A child, set. 8 months, was admitted with an abscess about the left ankle, and symptoms of pyæmia. There was also effusion about the left shoulder and elbow, the first symptoms of illness commencing one week before its admission. After admission the abscesses broke; but secondary deposits manifested themselves in the lungs, and the patient died eight days after it came to the Hospital.

Cancerous ulcers present us with 5 examples, of which 1 only was operated on during the year. This was a case of a man, set. 73, who had had an epithelial growth removed from the leg four years ago. The wound never quite healed; but the wound did not take on an epithelial character till twelve months before his admission. The leg was now amputated, and the patient recovered (see List of Operations on the lower extremity).

Another case of epithelial ulceration occurred in a man, set. 78,

who was admitted in December with a cancerous ulceration of the back of the right hand. Amputation of the forearm was performed, and the patient died; but as the operation was not resorted to till January 1870, the case will be recorded in the next Report.

TUMOURS AFFECTING THE SKIN AND APPENDAGES number 29, none proving fatal. They comprise 12 *fatty*, 9 *sebaceous*, 1 *encysted*, and 7 *malignant*. In all cases the growths were removed, 1 only being complicated, and that with erysipelas, which somewhat retarded the patient's recovery.

The remaining cases in this division include 5 of *carbuncle*, 1 of *boils*, 1 of *œdema*, 2 of *ulcer of the stump*, and a few others which will be found enumerated in another part of the Report. One of the cases entered as ulcers of stump calls for a brief notice. The patient, a married woman, æt. 36, who had lost the fore part of the foot from sloughing, was admitted with an obstinate ulcer on the remainder of the foot, which, though she had been in the Hospital several times, could not be got to heal; and as it prevented the patient from getting about and attending to her household, she was anxious that anything should be done to relieve her. Amputation of the foot was performed (see List of Operations); but sloughing of the flaps occurred, and the patient died of pyæmia.

DISEASES OF THE ORGANS OF DIGESTION furnish 141 examples, 27 of which died. One case of *abscess of the mouth*, and 1 of *ulceration of the mucous membrane*, were admitted, and being uncomplicated were soon discharged well. Five cases of *cleft palate*, and 3 of *harelip*, came under notice; 2 of the former, in which both the hard and soft palates were implicated, were operated on with a view of closing the aperture in the soft palate, but with success only in 1 instance. All 3 cases of *harelip* (one of which had been operated upon when the patient was a child) were successfully treated by a plastic operation. The other cases of *cleft palate* were deferred for a time, as they were not in a state of health to admit of any operation being performed.

Three cases of *enlarged tonsils*, in which the glands were excised, and 5 cases of *epithelioma* of the lip (one having gone under a previous operation for the disease about twelve months before), where the growths were removed, came under notice, but call for no special record; together with one case of *cancer*, involving the greater portion of the tongue, in a man, æt. 34, in whom the tongue was removed with the *écraseur* (see List of Operations), close our list of diseases affecting the mouth.

The total number of cases of *hernia* admitted was 33, 17 being strangulated, 12 reducible, and 4 irreducible. One case only calls for notice here; the remainder, where any operation was performed, being recorded in another part of the report. A woman, æt. 40, had been ruptured five years, but had always been able to reduce the hernia, and had always worn a truss. On the morning of admission the hernia came down, she was unable to reduce it, and symptoms of strangulation came on. When admitted there was a hernia the size of a pigeon's egg in the left groin, with all the symptoms of strangulation. Taxis

was applied, and something was felt to slip back; but as the swelling was but little reduced in size, and could not be farther returned, it was cut down upon and the sac opened, when nothing but a small amount of fluid, which escaped, was found. No other opening but the one just made could be found; but a fine membrane was felt stretching completely across the neck of the sac. This was divided, and the finger could then be passed into the abdominal cavity without farther obstacle. The solution of this case which seems most probable is, that there had been an old hernia, whose sac had been converted into a separate cavity from the abdomen by a membrane across its neck and filled with fluid. A recent hernia occurred, which came down and pushed this cyst before it, giving the appearance of being all one hernia; the recent hernia was no doubt reduced when taxis was applied, and was the cause of the sensation felt of something slipping back. The wound was closed with sutures, and the patient made an uninterrupted recovery.

One case that was not operated on was complicated with peritonitis, and recovered. It was that of a man, *æt.* 28, who was afflicted with a reducible scrotal hernia, but which was down at the time of the accident. He was struck while at work on the scrotum with a piece of timber; was admitted with peritonitis (the hernia having gone back). This subsided, however, under treatment, and he was discharged with a suitable truss at the end of three weeks.

Seven cases of *ulcer of the rectum*, 4 of which were incised; 28 of *fistula in ano*, and 10 of *hæmorrhoids* were admitted, with a fatal termination in only 2 instances. The first case of death occurred in a man, *æt.* 44, who was admitted with a fistula in ano and in the last stage of consumption, who died a week after being taken in. The second in a man, *æt.* 27, who was admitted with piles, which were treated with the actual cautery; four days after the application of the cautery, rigors and other symptoms of pyæmia set in, and he died twelve days after the operation. The remaining cases need no comment; 19 of fistula in ano, and 4 of hæmorrhoids, being operated on, the latter by means of the ligature.

The other cases affecting the lower part of the rectum comprise 6 of *stricture*, 2 being considerably benefited by incising the part; 3 of *cancer*, 1 dying, and 1 in whom Amussat's operation was performed (see List of Operations); and 2 of *polypus*, in which the growth was removed.

One other case, that of a woman, *æt.* 56, deserves a cursory review. She stated that she had been perfectly well, with the exception of an old hernia which was easily reduced, till two days before admission, when she was seized with great pain in the abdomen, and sickness. The hernia was down when the symptoms first set in, but was easily put back. The symptoms increased; so she came to the Hospital, and was taken in. On admission she complained of great pain in the abdomen, which was somewhat distended, and had a dry tongue and rapid pulse, with great thirst and fæcal vomiting. There was a left femoral hernia, which was easily reduced; but despite all treatment she rapidly sank, and died about eighteen hours after admission. At the post-mortem examination a small knuckle of intestine was found stran-

gulated in a hole in the omentum, and bound down by adhesions to the left crural ring.

DISEASES OF THE URINARY ORGANS furnish us with 84 examples, 9 of which proved fatal. Six cases are entered as *irritable bladder*, all of which were considerably benefited by treatment in the Hospital. One case of *inflammation of the bladder*, out of the 11 admitted, proved fatal, after the operation of lithotripsy (see List of Operations).

Twelve cases of *retention of urine* were admitted; and in 4 in which relief could not be obtained from opium and warm baths, and where no catheter was able to be introduced into the bladder, operative interference was imperative, and resorted to with success in 3 instances (see List of Operations).

Stone furnishes 14 cases, though 2 patients being readmitted reduces the number of different patients to 12. In 5 instances lithotomy was performed with success; and in 4 lithotripsy, with 1 death (see List of Operations). In 1 case where the stone could not be felt, though there was every reason to believe there was one, no operation was performed.

Eight cases of *stricture*, and 10 in which fistulous openings existed in the perinæum, came under notice, and 8 were operated on. One case, in which perineal section was performed, terminated fatally; the patient suffering also from diseased kidneys.

Seven cases of *enlarged prostate* were admitted, in patients all of whom were over 60 years of age, and terminated fatally in 2 instances; one being complicated with cancer of the bladder. One man, aged 58, who had suffered from stricture for about sixteen years, was admitted with extravasation of urine and extensive sloughing of the scrotum; he died of exhaustion seven days after admission.

Cancer of the bladder brought to notice 3 cases, 2 of which died in the Hospital; and the third was gradually sinking, but was removed by his friends. Two cases of *pyelitis*, and 2 of *extroversion of the bladder*, 1 of which was submitted to plastic operation with benefit; with 3 in which an opening existed between the rectum and urethra, close our list of diseases of the urinary organs. In the latter cases, abscess was the cause of the communication in 1 instance, and the operation for stone in the other 2, both of which were operated on with partial success.

DISEASES OF THE MALE ORGANS OF GENERATION furnish 85 cases, without any deaths. The venereal cases come first in the list, and number 32; of which *primary syphilis* furnishes 9, *secondaries* 19, and *gonorrhœa* 4 examples; though many of the diseases hereafter to be recorded were dependent on a syphilitic origin. Seven cases of *phimosis*, 6 of which were operated on, and 2 of *paraphimosis*, with 1 of *cancer of the penis*, occurring in a man, æt. 30, in which nearly the whole of the penis was removed with the knife (see List of Operations), comprise all in which the penis was implicated.

The *testis* and its coverings was the seat of disease in 30 instances; 12 of *hydrocele*, 1 of *hematocele*, and 17 of *orchitis*. In 4 of the former

a radical cure of the disease was attempted, either by the injection of iodine, or the introduction of a seton of silver wire; and in all there was a prospect of success, though the patients were lost sight of before the disease could be said to be perfectly cured. The only remaining cases in this class are 6 of *bubo*, and 6 of *varicocoe*; 2 of which were treated by subcutaneous section of the veins with success.

DISEASES OF THE FEMALE ORGANS OF GENERATION number 83 cases, 7 of which died; a few of which call for special notice. Considering first those diseases affecting the female breast, we have 9 of *abscess*, all of which did well; and 20 of *tumours*, comprising 4 chronic mammary, 1 sero-cystic, and 15 scirrhus, 11 of which were operated on, with 3 deaths (see List of Operations); *venereal diseases* include 2 of gonorrhoea, 7 of primary and 23 of secondary syphilis, none of which call for any special notice.

One young woman, *æt.* 19, was admitted three times during the year with a *vesico-vaginal fistula*, and submitted to plastic operations. The case is recorded in the Report of last year; and though the opening was greatly diminished, it could not be completely closed. At the last attempt a canula communicating externally with an india-rubber bag was passed through the rectum into the pouch at the back part of the vagina, with the hope that the urine would all pass out this way, and therefore not come in contact with the wound; but this was not successful, and no farther interference was attempted at present.

Nine cases of *ovarian disease* came under notice, and terminated fatally of peritonitis in 3 instances, 2 after ovariectomy was performed, of which the following are brief sketches:

E. S., *æt.* 40, a single woman, was always very healthy till eighteen months before admission, when she first noticed swelling in the right side of the abdomen, which rapidly increased in size. Paracentesis had been twice performed, the last time seven weeks before the operation. No chloroform was given, so as, if possible, to prevent any farther sickness, but the skin was frozen with the ether spray. An incision was made in the median line, about four inches long, commencing about one inch below the umbilicus; and in so doing a cavity was opened, out of which gushed about half a pint of darkish fluid. Being satisfied that this was not the cyst, but a cavity in the abdominal walls, the dissection was carried on and the cyst arrived at, which was tapped, and about three-quarters of a gallon of dark fluid, apparently containing blood, was drawn off. Some soft adhesions were broken down in front and the cyst drawn forward, when some very firm adhesions were found behind connected with the intestines, which had to be divided with the knife. The pedicle was very short; and a stout silk ligature having been tied round it, the mass was cut off and the wound closed. There was very little hæmorrhage, no vessels requiring to be ligatured. She was very low and blanched after the operation; sickness set in about seven hours later, and was frequently repeated during the night, nothing seeming to check it. About 9 A.M. the following morning she became collapsed, and rapidly sank, and died about 1 P.M. (24 hours after the operation).

The second case was that of M. H., æt. 38, a single woman, who had been in repeatedly before during the last eighteen months, and tapped at intervals of from ten weeks at first, to little more than a fortnight latterly. Chloroform having been administered, an incision about six inches long was made in the median line through the various textures to the wall of the cyst, which was accidentally pricked, and about a gallon of straw-coloured fluid let out. An attempt was then made to separate this from the abdominal walls; but it was so universally adherent that this could not be done, and it became apparent that this was only the thickened peritoneum. The wound was enlarged and the thickened peritoneum cut through, when behind a cyst the size of a man's head appeared, which was considerably adherent at the back part. After it had been loosened, it was pulled forward and tapped. Being quite globular and without any pedicle; a clamp was put round its lower part; but as this would not allow the wound to be closed, as there was no pedicle, it was secured with a silver ligature and the clamp removed. The wound was closed with sutures, &c. Morphia was freely administered after the operation, which the patient bore remarkably well, and she passed a fairly good evening and night; but the next morning was much weaker, and about 10 A.M. became semi-collapsed, and died 3 P.M. (26 hours after the operation).

Two cases of *ruptured perinæum*, the result of confinements, were admitted; 1 only of which was operated on, but with fatal result. The other, not being in a state of health to admit of any operation being performed, was discharged for a short time.

The only remaining case in this division was that of a little girl, æt. 7, who had had *congenital imperforate anus*, which had been operated on; but as the child had grown up, the opening of the vagina and rectum had been drawn into one outlet, the septum between them being drawn considerably up and very narrow. Several plastic operations were performed, with the view of bringing the orifice of the rectum to its proper position, with partial success; but as the patient is still under observation for a future operation, the details will be best recorded at a future time.

The last division is that of DISEASES OF THE BLOOD-GLANDS, in which 5 cases came to notice: one patient was admitted three times with a cyst of the thyroid gland, which was about the size of a man's fist; it was tapped and injected on every occasion with iodine, but with apparently very little benefit. Two cases of goitre, which were discharged in much the same state, conclude this portion of our Report.

TABLE OF SURGICAL CASES ADMITTED DURING
THE YEAR 1869.

Nature of injury.	Total number of admissions.	Total number of deaths.	Percentage of mortality.	Complicated with other injury or disease.	Operations.
A. General injuries:					
<i>a.</i> Burns	33	10	30.3	1	1
<i>b.</i> Scalds	16	1	6.2		
B. Local injuries:					
1. Of the head:					
<i>a.</i> Scalp-wounds	43	1	2.3	8	
<i>b.</i> Scalp-wounds exposing bone	18	3	16.6	3	
<i>c.</i> Concussion	34			2	
<i>d.</i> Fracture of the skull	6	6	100		
<i>e.</i> Compound	8	3	37.5	2	3
<i>f.</i> Fracture of base	9	3	33.3		
<i>g.</i> Contusions	2				
<i>h.</i> Laceration of brain	4	4	100	1	
2. Of the face:					
<i>a.</i> Fracture of the lower jaw	4	1	25	2	
<i>b.</i> " " bones of face	2			1	
<i>c.</i> Contusions of face	8				
<i>d.</i> Wounds of face	10			1	
<i>e.</i> " " eyeball	14				
3. Of the back:					
<i>a.</i> Fractured spine	4	2	50		
<i>b.</i> Sprains and contusions	29			2	
<i>c.</i> Wounds	3				
<i>d.</i> Fracture of spinous process	1				
4. Of the neck:					
<i>a.</i> Wounds	10	3	30	1	
<i>b.</i> Contusions	1				
5. Of the chest:					
<i>a.</i> Fractured ribs	21	6	28.5	11	
<i>b.</i> Contusions	9			1	
<i>c.</i> Wound of parietes	1				
<i>d.</i> Wound of lung	3	3	100	3	
6. Of the abdomen:					
<i>a.</i> Contusions	8	1	12.5	3	
<i>b.</i> Injuries of scrotum	2				
<i>c.</i> " " labium	2				
<i>d.</i> Ruptured viscus	3	3	100	1	

Nature of injury or disease.	Total number of admissions.	Total number of deaths.	Percentage of mortality.	Complicated with other injury or disease.	Operations.
B. Local injuries—continued.					
<i>c.</i> Fractured pelvis	3	1	33·3	1	
<i>f.</i> Ruptured urethra	1	1	100	1	1
7. Of the upper extremity :					
<i>a.</i> Contusions	9			1	
<i>b.</i> Wounds of arm	4				
<i>c.</i> " forearm	3	1	33·3	1	
<i>d.</i> " hand	4	1	25	3	
<i>e.</i> Fractured clavicle	6				
<i>f.</i> " humerus	16			2	1
<i>g.</i> " neck of humerus	1				
<i>h.</i> " forearm	5	1	20	1	
<i>i.</i> " olecranon	1				
<i>k.</i> Compound fractures	13	1	7·6	3	9
<i>l.</i> Dislocated elbow	1				
8. Of the lower extremity :					
<i>a.</i> Contusions	81				
<i>b.</i> Wounds of thigh	17				
<i>c.</i> " leg	13			1	
<i>d.</i> " foot	2				
<i>e.</i> " into joint	3	1	33·3	1	
<i>f.</i> Fractured femur	44	2	2·2		
<i>g.</i> " neck of femur	11	1	9·09		
<i>h.</i> " tibia	14				
<i>i.</i> " fibula	26			1	
<i>k.</i> " patella	13				
<i>l.</i> " leg	60	1	1·6	3	
<i>m.</i> " foot	4				
<i>n.</i> Comminuted fracture	1				
<i>o.</i> Compound "	17	9	53	6	7
<i>p.</i> Dislocated hip	1				1
<i>q.</i> " patella	1				1
<i>r.</i> " tarsal bone	2			1	
<i>s.</i> " knee	1				1
<i>t.</i> Sprained hip	3				
<i>u.</i> " knee	18				
<i>v.</i> " ankle	54				
C. General diseases :					
<i>a.</i> Erysipelas	27	3	11·1	18	5
<i>b.</i> Diffuse cellulitis	12	4	33·3	6	1
<i>c.</i> Sloughing	12	3	25	1	2
<i>d.</i> Gangrene	3				
<i>e.</i> Tetanus	1	1	100	1	
<i>f.</i> Pyæmia	23	23	100	23	14
<i>g.</i> Gout	1				
<i>h.</i> Measles	2			2	
<i>i.</i> Scarlatina	4	1	25	3	1
<i>k.</i> Rheumatism	6				1
D. Local diseases :					
1. Of the organs of motion :					
<i>a.</i> Acute ostitis	1	1	100	1	1

Nature of disease.	Total number of admissions.	Total number of deaths.	Percentage of mortality.	Complicated with other disease or injury.	Operations.
D. Local diseases— <i>continued</i> .					
1. Of the organs of motion :					
<i>b.</i> Abscess of bone	3	1	2·3	3	1
<i>c.</i> Necrosis	42	1	2·3	3	26
<i>d.</i> Caries	46	6	14·2	3	11
<i>e.</i> Diseased spine	42	2	18·1	2	7
<i>f.</i> Tumours of bone	11	2	18·1	2	7
<i>g.</i> Rickets	2	1	7·7	2	
<i>h.</i> Periostitis	13	3	14·3	5	9
<i>i.</i> Synovitis	38	3	14·3	3	12
<i>k.</i> Ulceration of cartilages	21	3	14·3	3	12
<i>l.</i> Abscess in joint	21	3	14·3	3	12
<i>m.</i> Rheumatic joint	2				
<i>n.</i> Ankylosis	3				
<i>o.</i> Diseased hip	60	2	3·3	2	4
<i>p.</i> Loose cartilage	1				
<i>q.</i> Inflamed bursa patellæ	19				1
<i>r.</i> " other bursa	1				
<i>s.</i> Bursal tumour	1				1
<i>t.</i> Thecal abscess	9				1
<i>u.</i> Contracted tendon	32			1	
<i>v.</i> Effusion into sheath	1				
<i>w.</i> Deformity	3				
<i>x.</i> Muscular atrophy	2				
2. Of the organs of circulation :					
<i>a.</i> Disease of heart	3	3	100	3	
<i>b.</i> Aneurysm	4	2	50	1	1
<i>c.</i> Nævus	3				2
<i>d.</i> Secondary hæmorrhage	4				
<i>e.</i> Varicose veins	16			1	8
<i>f.</i> Phlebitis	2				
<i>g.</i> Inflamed absorbents	17			1	
<i>h.</i> Suppurating glands	19			1	
<i>i.</i> Hypertrophy of glands	1				1
<i>k.</i> Tabes mesenterica	1				
<i>l.</i> Tumour of gland	1				1
3. Of the organs of respiration :					
<i>a.</i> Disease of larynx	1	1	100		
<i>b.</i> Bronchitis	8	3	37·5	8	1
<i>c.</i> Phthisis	7	1	14·3	3	
<i>d.</i> Pneumonia	6	5	83·3	6	
<i>e.</i> Whooping-cough	1				
<i>f.</i> Empyæma	2	1	50	1	
4. Of the nervous system :					
<i>a.</i> Meningitis	7	4	57·1	4	3
<i>b.</i> Delirium tremens	1				
<i>c.</i> Paralysis	9	1	11·1	2	1
<i>d.</i> Sciatica	3				
<i>e.</i> Neuroma	1				
<i>f.</i> Hysteria	13				
<i>g.</i> Apoplexy	1	1	100		

Nature of disease.	Total number of admissions.	Total number of deaths.	Percentage of mortality.	Complicated with other disease or injury.	Operations.
<i>D. Local diseases—continued.</i>					
5. Of the skin and appendages :					
a. Eczema	23	1	4.3	1	
b. Rupia	4				
c. Psoriasis	3				
d. Lichen	1				
e. Lepra	3				
f. Lupus	3				
g. Scabies	2				
h. Erythema	5				
i. Ulcer	67			2	
j. Abscess	55	2	3.6	2	1
k. Cancerous ulcers	5				1
l. Fatty tumour	12			1	12
m. Sebaceous "	9				
n. Encysted "	1				
o. Malignant "	7				
p. Carbuncle	5				
q. Boil	1				
r. Edema	1				
s. Ulcer of stump	2	1	50	1	1
t. Contracted cicatrix	2				2
u. Onychia	4				
v. Corn	1				
w. Ingrowing toenail	4				
x. Warts	1				1
6. Of the eye, ear, and nose :					
a. Conjunctivitis	25				
b. Corneitis	33				
c. Sclerotitis	9				
d. Iritis	12				
e. Cataract	11				
f. Amaurosis	11				
g. Glaucoma	7				
h. Abscess in ball	1				
i. Granular lids	5				
j. Abscess in sac	5				
k. Entropion	2				
l. Strabismus	11				
m. Exophthalmia	1				
n. Polypus	3				
o. Disorganisation of eye	1				
p. Abscess in orbit	1				
7. Of the organs of digestion :					
a. Abscess in mouth	1				
b. Ulceration of mucous membrane	1				
c. Cleft palate	5				2
d. Harelip	2				2
e. Enlarged tonsils	3				2
f. Epithelioma of lip	5				5

Nature of disease.	Total number of admissions.	Total number of deaths.	Percentage of mortality.	Complicated with other disease or injury.	Operations.
D. Local diseases—continued.					
7. Of the organs of digestion :					
g. Cancer of tongue	4				1
h. Strangulated hernia	17	9	53	11	16
i. Reducible "	12				
j. Irreducible "	4				
k. Peritonitis	14	12	85.7	14	10
l. Fæcal abscess	1				
m. Ulcer of rectum	7				4
n. Fistula in ano	28	1	3.5	1	19
o. Piles	10	1	10	1	4
p. Stricture of rectum	6				2
q. Prolapsus ani	5	1	20	1	
r. Ulceration of gut	1	1	100	1	1
s. Cancer of rectum	3	1	33.3		1
t. " œsophagus	1				
u. Polypus of rectum	2				1
v. internal strangulation	2	1	50		
w. Carious teeth and abscess	7				
8. Of the urinary organs :					
a. Albuminuria	1			1	
b. Irritable bladder	6				
c. Inflamed "	11	1	9.09	3	1
d. Hæmaturia	3				
e. Retention of urine	12	1	8.3	1	4
f. Stone	14	1	7.1		13
g. Stricture	8	1	12.5	1	1
h. Perineal fistula	10				2
i. Enlarged prostate	7	2	28.5	1	
j. Extravasation of urine	1	1	100		
k. Cancer of bladder	3	2	66.6	1	
l. Recto-urethral fistula	3				1
m. Pyelitis	2			1	
n. Extroversion of bladder	3				1
9. Of the male organs of generation :					
a. Syphilis	9				
b. Secondaries	19				
c. Gonorrhœa	4				
d. Phimosi s	7				6
e. Paraphimosis	2				
f. Bubo	6				
g. Hydrocele	12			1	4
h. Hæmatocele	1				
i. Orchitis	17			2	
j. Varicocele	6				2
k. Undescended testis	1				
l. Cancer of testis	2				1
10. Of the female organs of generation :					
a. Abscess of breast	7				
b. Milk-abscess	2				
c. Chronic mammary tumour	4				1

Nature of disease.	Total number of admissions.	Total number of deaths.	Percentage of mortality.	Complicated with other disease or injury.	Operations.
<i>D. Local diseases—continued.</i>					
10. Of the female organs of generation :					
<i>d.</i> Sero-cystic	1	.	.	.	1
<i>e.</i> Scirrhus	15	3	20	1	9
<i>f.</i> Gonorrhœa	2	.	.	.	.
<i>g.</i> Syphilis	7	.	.	1	.
<i>h.</i> Secondaries	23	.	.	.	.
<i>i.</i> Vesico-vaginal fistula	3	.	.	.	2
<i>j.</i> Leucorrhœa	2	.	.	.	.
<i>k.</i> Ovarian tumour	9	3	33·3	3	2
<i>l.</i> Prolapsus uteri	1	.	.	.	.
<i>m.</i> Abortion	1	.	.	1	.
<i>n.</i> Deficient perinæum	3	.	.	.	3
<i>o.</i> Cyst of labium	1	.	.	.	1
<i>p.</i> Ruptured perinæum	2	1	50	1	1
11. Of the blood-glands :					
<i>a.</i> Goitre	5	.	.	.	.

Table of Compound Fractures.

No.	Name, age, No. in Register, surgeon.	Limb.	Nature of accident.	State of fracture.	Treatment and result.	Remarks.
1.	Thomas T. Aged 42. (5, L.)	Left leg.	Railway engine passed against leg.	Contused wound about 1½ inches long on the inner side, through which the end of tibia protruded. Fracture of fibula in its lower third.	Enlargement of wound, and reduction of tibia. Assalini's box. Died, 20 days.	Profuse suppuration at the seat of fracture, with symptoms of pyæmia on the 15th day.
2.	Mary M. Aged 56. (87, H.)	Both legs.	Was in a train that was run into, and picked out of the ruin. Re- members nothing of accident.	Contused wound about 1½ inches long on the front of the left leg. Oblique fracture of middle of both bones. Tibia protruding one inch through wound. Small wound, ½ inch long, on inner side of calf of right leg, and oblique fracture of both bones.	Wounds closed with lint, and limbs placed in Assalini's boxes. Subsequent amputation of left thigh. Died, 30 days.	There was extensive sloughing of tissues of left leg. Symptoms of pyæmia set in before the amputation was performed, 13 days before her death. The right leg progressed favourably.
3.	George T. Aged 32. (259, H.)	Left leg.	Got jammed against the Park railings whilst riding.	Contused wound, size of shilling, on front and middle of leg. Great bruising of adjacent tissues. Oblique fracture of middle of both bones.	Pad of lint over wound. Assalini's box. Died, 33 days.	Abundant suppuration at seat of injury, with extensive burrowing of matter. Pyæmia set in on 14th day, and he died, with secondary deposit in lungs and liver.

4.	Edward O'B. Aged 49. (229, Pol.)	Right leg.	Fell off a scaffold about 20 feet high.	Incised wound on middle of inner side of leg about $\frac{3}{4}$ inch long. Oblique fracture of middle of both bones.	Pad of lint over wound. Assalini's box. Recovered.	He had also a simple fracture of both bones of left leg. Fracture of lower jaw, with wound of lip and bruising of the intestines, followed by peritonitis.
5.	Alfred W. Aged 15. (360, Hol.)	Right leg.	While jumping, he trod on a stone, and his leg twisted under him.	Small wound in front of middle of leg, with transverse fracture of both bones.	Lister's carbolic dressings. Assalini's box. Recovered.	
6.	William G. Aged 38. (490, Hol.)	Both legs.	Stone weighing about 6 cwt. fell on to his legs.	Both legs smashed up, with extensive laceration and bruising of soft tissues.	Primary amputation of both thighs. Stimulants. Died, 5 hours.	Was much collapsed on admission, and never rallied.
7.	William D. Aged 38. (493, Hol.)	Right leg.	Kicked by horse, which afterwards fell over on to his leg.	Oblique fracture of lower third of both bones. Contused wound, with about 1 inch of tibia (denuded of perosteum) protruding.	End of tibia sawn off. Carbolic dressings. Assalini's box. Died, 6 days.	
8.	Alfred B. Aged 20. (851, H.)	Right thigh.	Fell off a scaffold about 6 feet high.	Oblique fracture of femur, just above condyles, with a small punctured wound.	Pad of lint over wound. Inclined plane. Recovered, 43 days.	Lint removed on 10th day, and wound found quite healed.
9.	William H. Aged 29. (866, H.)	Right arm.	Iron box about 25 cwt. fell on to arm.	Humerus broken into three pieces. Two small wounds about $\frac{3}{4}$ inch long.	Inside angular splint, and water dressing. 30 days.	Very useful arm resulted; firm union; wounds nearly healed.

No.	Name, age, No. in Register, surgeon.	Limb.	Nature of accident.	State of fracture.	Treatment and result.	Remarks.
10.	Charles F. Aged 16. (938, L.)	Left leg.	Fell from a tree, and leg twisted under him.	Comminuted fracture of lower third of fibula. Rupture of internal lateral ligament. Contused wound about 1½ inches long over outer side of ankle.	Wound enlarged, and two small portions of fibula removed. Closed with sutures. Water dressing. Inside splint. Recovered, 86 days.	Considerable suppuration both about and within the ankle-joint, resulting in an ankylosed joint.
11.	Edward T. Aged 51. (1005, H.)	Right thigh.	Knocked over and kicked while leading a horse.	Oblique fracture of lower third of femur, with incised wound in front about 1½ inches long.	Pad of lint over wound. Inclined plane. Recovered, 56 days.	He had threatening delirium tremens, and lint slipped off on the 4th day. It was replaced; and when removed on 21st day, the wound was found healed.
12.	Isaac B. Aged 38. (1086, L.)	Left forearm.	Stone of about 5 cwt. fell against arm.	Oblique fracture of middle of both bones, with small wound on either side.	Pad of lint over wounds, and straight palmer splint. Recovered, 21 days.	Two days after admission the lint was removed, as there was great swelling. This subsided; and when discharged the wounds were nearly healed.
13.	James T. Aged 9. (1115, Hol.)	Right leg.	Wheel of cab passed over his leg.	Oblique fracture of middle of both bones, with small punctured wound.	Pad of lint to close wound. Assalini's box. Recovered, 38 days.	The lint separated on the 5th day, leaving a healthy wound, which was almost healed when he left the Hospital.

14.	Laurence M. Aged 9. (1246, L.)	Right forearm.	Whilst playing at leap-frog, he fell over on to his arm.	Oblique fracture of middle of both bones, and a small punctured wound on the inner side.	Wound closed with a pad of lint. Straight splint on dorsal aspect of forearm. Recovered, 29 days. Stimulants. Died, 8 hours.	The wound was opened on the 2d day, as there was a great deal of tension. Quite healed before he left the Hospital.
15.	William D. Aged 37. (1322, H.)	Left thigh.	Knocked down by a train, and dragged along with it by his left leg.	Left thigh smashed up, and almost torn from his body.	Primary amputation of leg. Died, 7 days.	Died of exhaustion.
16.	Cornelius C. Aged 58. (1375, Pol.)	Right Leg.	Slipped off some steps while at work, and twisted his leg under him.	Fracture of both bones into the ankle-joint, and wound 3 inches long over the inner malleolus.		

TABULAR STATEMENT OF OPERATIONS PERFORMED DURING THE YEAR 1869.

CLASS I. *Operations on the Head, Neck, and Face.*

No.	Name No. in Register, and surgeon.	Age.	Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
1.	Augustus C. (10, L.)	40	M.	Aneurysm of carotid artery.	Ligature of common carotid.	Died, 6 weeks.	There was also disease of the liver, of which he died.
2.	Frank M. (376, R.)	22	M.	Compound depressed fracture of the skull.	Elevating and removal of bone.	Recovered, 29 days.	The fracture was situated over the anterior part of the right parietal bone. Numerous portions removed. Recovered without an unfavourable symptom.
3.	Bridget H. (1324, R.)	47	F.	Inflammation of diploë and suppuration after depressed fracture of skull.	Trephining of the skull.	Died same day.	The operation was performed 15 days after the accident. (See Injuries of the Head.)
4.	William P. (1581, Hol.)	12	M.	Compound comminuted fracture of the skull.	Elevation and removal of bone.	Recovered, 48 days.	He was also suffering from fractured leg. (See Injuries of the Head.)
5.	Henry W. (1918, Hol.)	15	M.	Smashing-in of the skull.	Elevation and removal of bone.	Died half an hour after admission.	There was also wounding, and escape of the brain-substance.

6.	Catherine J. (706, Pol.)	40	F.	Epulis of lower jaw.	Removal of growth with portion of alveolar ridge.	Recovered, 12 days.	The growth began 12 years ago, and was removed 7 years ago. Soon recurred, and reached a consider- able size. The growth was very small. A similar one was remov- ed 1 year before. (See last year's Report.) The attempt was unsucces- ful, no union taking place. A fissure in the lip had been operated on succe- ssfully 3 years before.
7.	Sarah B. (1117, H.)	27	F.	Epulis of lower jaw.	Removal.	Recovered, 2 days.	The union was perfect throughout. A harelip had been operated on with success when he was 5 years old.
8.	George P. (1537, Hol.)	4	M.	Cleft of both hard and soft palates.	Closure of soft palate.	Recovered, 16 days.	Removed as far back as the écraseur could be got through the mouth. (See also last year's Report.)
9.	William Mc. (1823, Pol.)	29	M.	Cleft of both hard and soft palates.	Closure of soft palate.	Recovered, 11 days.	
10.	Henry C. (1114, Hol.)	34	M.	Recurrent epithelioma of tongue and diseased glands.	Removal of tongue with écraseur, and excision of glands.	Recovered, 38 days.	

Besides the above, there were : four operations for the cure of harelip, and five for epithelioma, three for the removal of dead bone, and eleven for tumours, chiefly of a sebaceous nature.

CLASS-II.
Operations on the Upper Extremity.

No.	Name, No. in Register, and surgeon.	Age.	Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
1.	Janet W. (245, R.)	47	F.	Abscess of elbow-joint.	Circular amputation of arm.	Recovered, 43 days.	The arteries were secured by a twist of silver wire, the ends being cut off short, and left in the wound. Lister's carbolic dressing.
2.	Henry C. (1931, of 1868, L.)	56	M.	Abscess of wrist-joint.	Circular amputation of forearm down to bone.	Recovered, 27 days.	The circular incision was made at once down to the bone, cutting through all the tissues on the same level. An incision was also made over the radius, to facilitate the securing of the arteries, some of which were ligatured, and some treated by torsion. A capital stump resulted.
3.	William K. (114, R.)	41	M.	Paralysis after injury.	Amputation of forearm (semilunar flaps of skin, circular through muscles).	Recovered, 34 days.	Vessels secured by torsion.
4.	James P. (494, Hol.)	10	M.	Smashing of hand, and extensive laceration of soft tissues.	Primary amputation of forearm, semilunar flaps.	Recovered, 21 days.	

5.	Alfred H. (299, L.)	18	M.	Caries of carpus.	Circular amputation of forearm.	Recovered, 19 days.	The amputation was performed as No. 2.
6.	Owen G. (1419, Pol.)	47	M.	Malignant tumour of scapula.	Removal of growth with the whole of scapula.	Died, 5 days.	
7.	Henrietta E. (576, R.)	4	F.	Abscess in elbow-joint.	Excision of joint.	Recovered, 2 months.	Discharged with the wound nearly healed. Fair flexion and extension, but very slight pronation or supination. Readmitted in 1870.
8.	Arthur D. (1189, Pol.)	23	M.	Abscess in elbow and caries of the end of the bones.	Excision of elbow-joint.	Recovered, 18 days.	Wound healing, and a promising useful joint.
9.	Robert A. (1342, Pol.)	26	M.	Abscess of elbow-joint.	Excision of joint.	Recovered, 49 days.	The elbow did well; but there was also scrofulous abscess of kidney.
10.	Annie D. (1563, P.)	6	F.	Old fracture into elbow-joint and bad union.	Excision of elbow-joint.	Recovered, 9 weeks.	A more useful arm resulted. (See Injuries of the Upper Extremity.)
11.	David H. (1915, R.)	35	M.	Necrosis of upper part of humerus and abscess in shoulder-joint.	Removal of head and upper part of shaft of humerus.	Died, 4 weeks.	Pyæmia set in about the end of third week, of which he died.
12.	Emily D. (468, L.)	22	F.	Abscess of remains of humerus after amputation of the arm.	Removal of the remainder of the humerus.	Recovered, 2 months.	See Diseases of the Organs of Motion in previous Reports.

Besides the above, there were : sixteen cases in which a portion of the hand was removed, two operations for dead bone, five removal of tumours, and one plastic operation on an old case of burn.

CLASS III.
Operations on the Thorax.

No.	Name, No. in Register, and surgeon.	Age.	Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
1.	Eliz. H. (881, H.)	49	F.	Sero-cystic disease of breast.	Amputation of breast.	Recovered, 4 weeks.	An attack of erysipelas retarded recovery.
2.	Eliz. L. (906, L.)	55	F.	Scirrhus of breast.	Amputation of breast.	Died, 1 week.	There was also cancer of liver.
3.	Eliza C. (970, Hol.)	45	F.	Scirrhus of breast and gland in axilla.	Amputation of breast and removal of gland.	Recovered, 15 days.	Wound dressed after Lister's method, and healed by first intention. Subsequent return of disease.
4.	Eliz. J. (1104, Pol.)	50	F.	Scirrhus of breast and enlarged gland.	Amputation of breast and excision of gland.	Recovered, 18 days.	Wound almost healed.
5.	Ann J. (1260, Pol.)	45	F.	Scirrhus breast.	Amputation of breast.	Recovered, 18 days.	Wound almost healed.
6.	Jane B. (1409, R.)	59	F.	Scirrhus breast.	Amputation of breast.	Recovered, 28 days.	

7.	Ellen H. (1450, R.)	44	F.	Scirrhus of breast.	Amputation of breast.	Recovered, 27 days.
8.	Emma G. (593, Pol.)	50	F.	Scirrhus tumour of breast.	Removal of tumour.	Recovered, 20 days.
9.	Harriet M. (1026, Pol.)	57	F.	Scirrhus tumour of breast.	Removal of tumour.	Recovered, 14 days.
10.	Blanche B. (1033, Pol.)	27	F.	Adenoid tumour of breast.	Removal of tumour.	Recovered, 9 days.

Besides the above, eight fatty tumours were removed.

CLASS IV.
Operations on the Abdomen.

No.	Name, No. in Register, and surgeon.	Age.	Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
1.	Henry H. (19, L.)	35	M.	Congenital scrotal hernia, quite reducible. Truss worn, but broken at time of accident.	Sac opened, and contained about 1 oz. of bloody serum, and a small knuckle of intestine somewhat congested.	Died, 22 days.	There was a stricture at either ring. Pyæmia set in on 14th day.
2.	Eliz. W. (463, L.)	60	F.	Old femoral hernia, quite reducible till one year before. No truss worn. Strangulated, 13 hours.	Sac contained portion of omentum adherent to wall, some clotted blood, and small knuckle of gut slightly congested.	Died, 36 hours.	Intestines found very vascular and injected after death, and an extravasation of blood in the abdominal walls.
3.	Mary M. (646, R.)	56	F.	Inguinal hernia of 6 months' standing. No truss worn. Strangulated, 78 hours.	Sac contained a few drops of serum, a mass of omentum, and a small portion of gut slightly congested.	Recovered, 34 days.	Recovery retarded by an attack of cystitis.
4.	Eliz. P. (652, Hol.)	37	F.	Femoral hernia, 18 months, easily reducible. No truss worn. Strangulated, 47 hours.	Sac contained about 2 in. of gut very congested, with four or five whitish patches on its surface.	Recovered, 31 days.	Erysipelas set in in neighbourhood of wound 14 days after the operation, which somewhat prolonged her stay in the Hospital.

5.	Alice H. (848, H.)	28	F.	Old femoral hernia, quite reducible. No truss worn. Strangulated, 48 hours.	Sac contained some fluid feces, the gut being perforated by an ulcer the size of a split pea.	Died, 6 hours.	Gut stitched to edges of the wound. About half an hour after the operation she became collapsed, and rapidly sank.
6.	Eliza C. (744, R.)	34	F.	Recent umbilical. Period of strangulation uncertain.	Sac contained a mass of omentum slightly congested, and a small knuckle of intestine very congested, and perforated by a small ulcer.	Died, 8 hours.	Gut stitched to edges of wound. (For details, see under head of Hernia in other part of Report.)
7.	William L. (1287, P.)	30	M.	Inguinal hernia, 7 years; easily reducible. No truss worn. Strangulated, 4 hours.	Sac contained a mass of omentum, and small portion of gut a good deal congested.	Recovered, 26 days.	No unfavourable symptom.
8.	Maria T. (1369, Pol.)	58	F.	Femoral hernia, 6 years; quite reducible. No truss worn. Strangulated, 27 hours.	Sac contained about $\frac{1}{2}$ oz. of serous fluid, a mass of omentum and small knuckle of intestine, both slightly congested.	Died, 4 hours.	Became collapsed, and rapidly sank. Intestines found very vascular, and smeared with recent lymph. Wound in lower part of ileum about $\frac{1}{2}$ in. long, and an extravasation of grumous fluid into the abdominal cavity.
9.	Alfred B. (1483, R.)	34	M.	Scrotal hernia 10 years, easily reducible. No truss worn. Strangulated, 60 hours.	Sac opened, and contained large portion of large intestine slightly congested, and firmly adherent to sac.	Died, 39 hours.	The gut was so adherent that it could not be returned after the stricture was divided. Died of peritonitis.
10.	Harriet V. (1593, Hol.)	50	F.	Umbilical hernia 18 years; never quite reducible; support worn. Strangulated, 28 hours.	Sac opened, and contained the greater part of the intestines slightly congested and adherent to sac.	Died, 6 days.	Constriction divided; but as the contents of sac could not be easily returned, they were left. Died of peritonitis.

No.	Name, No. in Register, and surgeon.	Age.	Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
11.	Sophia K. (1619, H.)	56	F.	Recent femoral hernia. Strangulated, 21½ hours.	Sac opened, and contained a small knuckle of intestine the colour of chocolate.	Recovered, 26 days.	
12.	John P. (1668, Pol.)	38	M.	Scrotal hernia 18 years. Truss worn. Strangulated, 22 hours.	Sac opened, and contained a little dark grumous fluid, and about 4 in. of small intestine very congested, with lymph on its surface.	Recovered, 20 days.	Never had a bad symptom.
13.	Luke C. (1703, P.)	67	M.	Large umbilical hernia of 10 months' standing. Never quite reducible. Support worn. Strangulated, 76 hours.	Sac contained about ½ oz. of dark grumous fluid, and about 1½ inches of gut very congested, and glued together with deposits of recent lymph.	Died, 9 days.	He died of an extremely fatty heart. Intestine adherent to wound, and so thinned that it gave way in removing it. Rest of intestine natural.
14.	Peter S. (1730, R.)	30	M.	Scrotal hernia, 14 years. No truss worn. Strangulated, 4½ hours.	Sac contained large amount of small intestine somewhat congested, and some mesentery slightly bruised.	Died, 5 days.	Died of peritonitis, and an acute attack of bronchitis supervening on chronic mischief in the lungs.
15.	John B. (1955, H.)	20	M.	Congenital scrotal hernia, down since 7 months old. Easily reducible. Wore truss till 5 years ago. Strangulated, 2 hours.	Sac contained about 2 oz. of straw-coloured fluid, and about 6 inches of small intestine somewhat congested.	Recovered, 37 days.	Considerable difficulty in reducing gut, owing to a constriction at either ring.
16.	Mary Ann C. (Medical Register, H.)	47	F.	Cancer of rectum.	Colotomy.	Recovered, 3½ months.	There was considerable protrusion of the intestine through the wound when she was discharged; but no passage of faeces through the rectum.

17.	Eliz. C. (77, H.)	40	F.	Obliterated sac of hernia, with effusion into its ca- vity, resembling a hernia.	Operation for hernia. Sac opened, but only con- tained fluid.	Recovered, 25 days.	Never had an unfavourable symptom after the opera- tion. (See Diseases of the Organs of Digestion.)
18.	Eliz. S. (161, L.)	40	F.	Ovarian cyst.	Ovariectomy.	Died next day.	See Diseases of the Female Organs of Digestion.
19.	Mary H. (1310, R.)	38	F.	Ovarian cyst.	Ovariectomy.	Died next day.	Organs of Generation. See Diseases of the Female Organs of Generation.
20.	Steward D. (178, Hol.)	27	M	Hæmorrhoids.	Strangulated, with clamp and actual cautery ap- plied.	Died, 12 days.	Died of pyæmia. (See Dis- eases of Organs of Di- gestion.)

Besides the above, there were : nineteen operations for the cure of fistula in ano, and four for hæmorrhoids.

CLASS V.
Operations on the Genito-Urinary Organs.

No.	Name, No. in Register, and surgeon.	Age.	Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
1.	James B. (78, H.)	11	M.	Calculus.	Lithotomy (lateral).	Recovered, 30 days.	The calculus was the size of a large cobnut, and composed of oxalate of lime.
2.	Richard McA. (818, Pol.)	2½	M.	Calculus.	Lithotomy (lateral).	Recovered, 12 days.	The calculus was the size of a French bean, and composed of oxalate of lime.
3.	William H. (1428, Hol.)	48	M.	Calculus.	Lithotomy (lateral).	Recovered, 44 days.	Two calculi, size of large bean, of lithic acid.
4.	William McD. (1828, Pol.)	46	M.	Calculus.	Lithotomy (lateral).	Recovered, 49 days.	This patient had passed upwards of 200 calculi since the year 1846. The one for which the operation was performed was the size of a large walnut, consisting of small nucleus of oxalate of lime, surrounded by a large deposit of phosphates.

5.	Henry B. (1400, R.)	28	M.	Calculus.	Lithotrity, and subsequently median lithotomy.	Recovered, 48 days.	This patient was crushed in 1868. (See Report for that year; also in this Report, Diseases of Urinary Organs.)
6.	William F. (32, 403, 747, 1152, Hol.)	71	M.	Calculus.	Lithotrity.	Recovered.	This patient had been crushed at the Stone Hospital in June 1868; was crushed five times in St. George's. The bladder still continued very irritable, large amounts of phosphates being deposited; but no portion of calculus was detected when he was discharged the last time.
7.	George R. (200, H.)	54	M.	Calculus.	Lithotrity.	Recovered.	Was an in-patient in 1868 (see Report for that year); came in again in February 1869, and remained till March 1870. Crushed thirty-two times. When discharged was free from pain. Urine natural.
8.	Thomas G. (247, R.)	57	M.	Calculus.	Lithotrity.	Died, 9 days after operation.	The calculus was a large one of oxalate of lime. Died of cystitis and diffuse pelvis cellulitis.
9.	Joseph J. (1037, 1250, 1653, Pol.)	71	M.	Calculus.	Lithotrity.	Recovered.	Was crushed in here in 1866. (See Report for that year.) Readmitted several times in 1869, and crushed 8 times. Bladder continued very irritable.

No.	Name, No. in Register, and surgeon.	Age.	Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
10.	James D. (496, Hol.)	55	M.	Retention of urine from old stricture of urethra (35 years).	Puncture of bladder per rectum.	Recovered, 57 days.	The stricture was very firm and tight, and no catheter could be got through it, urine escaping through both openings when he was discharged.
11.	Thomas K. (1181, R.)	39	M.	Retention of urine from stricture of 12 years' standing.	Puncture of bladder per rectum.	Recovered, 8 weeks.	No urine per rectum after 14th day. No catheter could be passed into the bladder.
12.	Jacob E. (222, H.)	45	M.	Stricture of urethra and abscess from malignant disease.	Perineal section.	Died, 6 weeks.	After death the pelvis was found full of one mass of cancer, and it was impossible to say where it had commenced.
13.	James P. (417, R.)	60	M.	Ruptured urethra.	Perineal section.	Died, 8 days.	Had also diseased kidneys.
14.	Isaac P. (732, Pol.)	49	M.	Stricture of urethra and perineal fistulae.	Perineal section.	Recovered, 14 days.	Perineal section had been performed 7 years before.
15.	Henry M. (886, R.)	45	M.	Stricture of urethra and perineal fistulae.	Perineal section.	Died, 84 days.	There was also disease of the kidneys.
16.	Thomas M. (2012, L.)	63	M.	Extravasation of urine and stricture.	Perineal section.	Died, 3 days.	

Besides the above, there were: one amputation of the penis, five plastic operations, and two for the cure of varicocele.

CLASS VI.
Operations on the Lower Extremity.

No.	Name, No. in Register, and surgeon.	Age.	Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
1.	William J. (1821, of 1868, H.)	29	M.	Abscess of knee-joint.	Circular amputation through lower third of thigh.	Recovered, 55 days.	At the time of the operation there was a large vomica in the right apex. The stump healed well; and for a time the patient's condition was improved. Progressed most favourably till 5 days before his death, when symptoms of pyæmia set in. Symptoms of pyæmia existed prior to the operation; but as her state somewhat improved, amputation was resorted to. She died of pyæmia.
2.	Stratton M. (68, R.)	32	M.	Myeloid tumour of head of tibia.	Amputation through lower third of thigh (semilunar flaps of skin, circular through muscles). Secondary circular amputation through lower third of thigh.	Died, 23 days.	
3.	Mary M. (87, H.)	56	F.	Sloughing after compound fracture of leg.		Died, 13 days.	A very good stump resulted. (For account of case, see Diseases of Organs of Circulation in Report for 1868.)
4.	Henry C. (1668, of 1868, H.)	60	M.	Sloughing of foot and popliteal aneurysm.	Circular amputation of lower third of thigh.	Recovered, 60 days.	

No.	Name, No. in Register, and surgeon.	Age. Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
5.	Fred. T. (181, Hol.)	12 M.	Strumous disease of knee.	Amputation through lower third of thigh—skin flaps—circular through muscles.	Died, 29 days.	Was in a very low state, but progressed favourably for about 3 weeks, when pyæmia set in.
6.	William G. (490, Hol.)	38 M.	Smashing of both legs with extensive laceration of soft tissues.	Primary circular amputation of both thighs.	Died same day, 5 hours after.	Was semi-collapsed from loss of blood, and never rallied.
7.	Ellen H. (390, Pol.)	32 F.	Ulceration of cartilages of knee.	Amputation of thigh through condyles, by long anterior flap—patella removed.	Recovered, 41 days.	Did well, though small abscesses formed where the patella was dissected out from.
8.	Joseph S. (633, Hol.)	40 M.	Ulceration of cartilages of knee.	Amputation of thigh through condyles, by long anterior flap—patella removed.	Died, 7 days.	Stump treated with Lister's carbolic dressings. Pyæmia set in on the 4th day.
9.	Benj. E. (717, Pol.)	22 M.	Abscess of knee-joint.	Amputation of thigh through condyles, by long anterior flap—patella removed.	Recovered, 142 days.	Vessels secured with carbolic catgut. Secondary hæmorrhage about 4 hours after operation, from ligature slipping off the popliteal artery which was then tied with silk. Did ultimately well, though at first there was considerable retraction of flap.

10.	George T. (1001, Hol.)	25	M.	Ulceration of cartilages and abscess in knee-joint.	Amputation of thigh through condyles, by long anterior flap—under sur- face of patella only was removed.	Recovered, 90 days.	There was bagging of mat- ter at the inner side of stump, but his stay in the Hospital was delayed by another operation un- connected with the knee. Small superficial abscess formed over the end of stump, which was a very good one.
11.	Julia C. (1389, Pol.)	20	F.	Myeloid tumour of head of tibia.	Disarticulation at knee- joint—patella not re- moved.	Recovered, 34 days.	Was in an extremely pro- strate state, and died of exhaustion.
12.	William H. (1766, Hol.)	63	M.	Extensive sloughing after diffuse cellulitis of leg.	Amputation (circular) through lower third of thigh.	Died, 5 days.	Died of pyæmia, symp- toms of which existed before the operation was performed.
13.	James B. (1665, Pol.)	18	M.	Acute ostitis of tibia after injury, and subsequent suppuration in the knee- joint.	Amputation through the middle of thigh—skin flaps—circular through muscles.	Died, 7 days.	Sloughing of flap, and py- æmia on 5th day.
14.	John L. (128, R.)	23	M.	Smashing of foot, and ex- tensive bruising and la- ceration of soft tissues of lower part of leg.	Primary amputation of lower third of leg—skin flaps.	Died, 12 days.	A circular incision through all the tissues down to the bone on the same level, similar to operation No. 2 of upper extremity.
15.	Edward B. (142, L.)	73	M.	Epithelial growth of leg.	Circular amputation of leg.	Recovered, 62 days.	Bleeding arrested by tor- sion and stump dressed after Lister's plan. He died of tubercle in lung, which assumed an acute form after the operation.
16.	William S. (1706, of 1868, R.)	18	M.	Caries of astragalus, and ulceration of cartilages of ankle-joint.	Syme's amputation of leg.	Died, 21 days.	

No.	Name, No. in Register, and surgeon.	Age.	Sex.	Nature of disease.	Nature of operation.	Result, and at what date.	Remarks.
17.	George W. (497, Hol.)	11	M.	Sloughing after crushing of toes.	Secondary amputation of foot (Virgoff's).	Died, 12 days.	Died of pyemia, which set in 5 days after the operation.
18.	Ernest C. (596, H.)	19	M.	Caries of tarsus and ulceration of cartilages of ankle-joint.	Amputation of lower third of leg—long anterior rectangular flap.	Recovered, 82 days.	Stump treated with carbolic dressings.
19.	William W. (941, Hol.)	39	M.	Abscess of ankle-joint.	Amputation of lower third of leg—semilunar flaps of skin and muscles.	Recovered, 41 days.	Sloughing of stump set in, and pyemia.
20.	Ann S. (1103, Hol.)	36	F.	Old ulceration of foot.	Amputation of foot (Virgoff's).	Died, 11 days.	Died of exhaustion.
21.	Cornelius C. (1375, Pol.)	58	M.	Compound fracture into ankle-joint.	Amputation of lower third of leg—semilunar flaps of skin—circular through muscles.	Died, 7 days.	Wound almost healed.
22.	Joseph P. (1190, Pol.)	47	M.	Caries of tarsus and ulceration of cartilages of ankle-joint.	Syme's amputation of leg.	Recovered, 19 days.	When discharged the wound was nearly healed and limb 1½ inches shorter.
23.	James C. (207, R.)	5	M.	Abscess of hip-joint and caries of bones.	Excision of hip.	Recovered, 4 months.	Still a patient of Convalescent Hospital.
24.	Annie L. (1432, L.)	6	F.	Diseased hip and abscess.	Excision of hip.	Recovered, 10 weeks.	Died of exhaustion.
25.	Leah F. (1743, Hol.)	12	F.	Diseased hip.	Excision of hip.	Recovered.	
26.	William B. (444, L.)	5	M.	Caries of head of femur.	Excision of head of bone.	Died, 2 days.	

27.	James T. (910, L.)	34	M.	Ulceration of cartilages of knee and abcess.	Excision of knee-joint.	Recovered, 8½ months.	Limb 1½ inches shorter. In May 1870 was at work as labourer and quite strong. See Diseases of the Organs of Motion.
28.	Richard P. (342, Hol.)	18	M.	Caries of astragalus and abcess of ankle.	Excision of ankle-joint.	Recovered, 4 months.	See Diseases of the Organs of Motion.
29.	George C. (1896, Hol.)	16	M.	Abcess of end of tibia and destruction of ankle.	Excision of ankle-joint.	Recovered, 2 months.	See Diseases of the Organs of Motion.
30.	Edna V. (424, Hol.)	18	F.	Caries of os calcis.	Excision of os calcis.	Recovered, 6 weeks.	Wound nearly healed; use- ful foot.
31.	Sarah T. (1538, Hol.)	45	F.	Caries of tarsal bones of both feet.	Excision of cuboid and 4th and 5th metatarsal bones in either foot.	Recovered, 7 weeks.	See Diseases of the Organs of Motion.

There were also twenty-six operations for dead bone, three for removal of tumours, eight for the cure of varicose veins, and five in which a portion of the foot was removed.

WILLIAM LEIGH,
Surgical Registrar.

XIX. REPORT OF THE CASES TREATED IN THE OPHTHALMIC DEPARTMENT

FROM DECEMBER 1868 TO JULY 1870.

It will be seen by comparing the statistical tables at the end of this paper, prepared by my able assistants Mr. Lake and Mr. Beach, with the Reports for 1868, that the number of patients attending at and admitted into the Hospital during the year 1869 and part of 1870 has undergone steady increase. In the following pages I have selected some of the cases that have presented special interest; and I can only regret that in consequence of many of them occurring amongst the out-patients, the account should be of so fragmentary a character.

The cases of ptosis have been rather numerous, and I subjoin the notes taken of nearly all. The forms of the affection that are generally distinguished by authors are:

1. Congenital ptosis.
2. Ptosis arising from physical change in the lid itself;
and,
3. Ptosis arising from paralysis of the third nerve, or of the branch of the third distributed to the levator palpebræ.

In the congenital form of ptosis we must admit either some defect of development in the nerve-centres (I have seen it in a hydrocephalic child); or there may be imperfect formation of the third nerve, absence or imperfect development of the levator palpebræ, or possibly in some cases only an improper insertion of the tendon. Mackenzie and Middlemore both state that they have met with many cases of congenital ptosis; it has not often fallen under my observation.

Ptosis arising from physical changes in the lid itself includes those forms that are produced by swelling and

inflammation either acute or chronic, by blows and cuts, and the peculiar relaxation or redundancy of skin met with not unfrequently in old age. This last variety cannot always be easily distinguished from the paralytic form. In both the patient is unable to raise the lid; but in the former, if the skin be pinched into a fold (and a light pair of forceps for this purpose, in a doubtful case, was once ingeniously extemporised by M. Luer from a lady's hair-pin), the levator may be seen, when an effort is made, to contract to a greater or less extent, whilst in the latter case it remains absolutely passive.

The causes leading to the third form of ptosis, in which the nerve supplying the levator palpebræ is paralysed, are various. Sometimes it is a symptom of serious import, indicating intra-cranial lesion, apoplectic clot, or cerebral disorganisation, and being then usually combined with paralysis of the second, fourth, fifth, or seventh nerves. At others—and these constitute the great majority of the cases seen—it is of a rheumatic type, and of a less formidable character, resulting from exposure to cold; which probably means that there is a local inflammation affecting a certain portion of the nerve, and rendering it incapable of transmitting motor impulses, but which, when the inflammation is subdued, leaves it in a state fit for the resumption of its functions. Paralysis of the nerve may again be induced by tumours, abscesses, &c. in the orbit, compressing the nerve by their growth through some part of its course. Lastly, paralysis of the third nerve may be the consequence of an impairment of the tone, energy, and activity of the nervous system generally, as may be seen in some conditions of hysteria and asthma. Nor is this surprising, when it is remembered that in that condition of the nervous system which accompanies exhaustion, the very first indication of the loss of voluntary power over the muscles is the falling of the lids in the natural ptosis of sleep. The first case here recorded is one of an exceptional character, and appears to be partly reflex and dependent on considerable disorder of the bowels, and partly hysterical, though the patient otherwise behaved herself sensibly enough.

E. S., æt. 45, a small sallow woman, was brought to the Hospital by her husband, complaining of inability to raise the lids of her eyes, on account of the intense pain produced by the impression of even moderate light. She had a bandage over the eyes, and over this a poke bonnet, with a doubled black veil. She stated that about two years ago she had an attack of hemiplegia on her left side, and that since then the vision of her left eye had been seriously impaired. Since then also she had suffered, on about twenty separate occasions, from attacks similar to the present, occurring at irregular intervals. During these attacks the intense photophobia lasted about two or three hours. The attacks came on at uncertain intervals, and were not connected with menstruation, as this had ceased for several years. The last attack occurred a week ago, and lasted four days. The attack commences with a feeling of several cords pulling the eye backwards and downwards, and the intolerance of light then rapidly supervenes, and remains persistent throughout the whole period. Her bowels have been for a long time much confined. Her pulse was 70, rather feeble. The tension of the globes was natural. I removed the coverings, and with a little encouragement and some force obtained a full view of the globe. The conjunctiva was pale; the pupil contracted to a moderate but not very remarkable extent. A copious discharge of tears took place from the eye during the examination. Considering it to be a case of nervous irritation connected with disorder of the bowels, and exaggerated by nervous depression, I ordered her to take a brisk purgative on two or three mornings successively, and at the same time to take the following prescription: *R zinci sulphatis gr. ij.; pil. hydrargyri gr. ij.; pulv. opii gr. ss., ft pil. ter die sumend.* She took these pills for a week, and returned with her eyes wide open, free from all intolerance, and stating that she felt much better in her general health. The purgatives had cleared the bowels of much dark and fetid material. She was now ordered to discontinue the pills, and take decoction of cinchona, and four minims of solution of strychnia, with the view of improving the general tone of her system. In four days she returned, suffering from a bad attack, which was apparently connected with constipation. The medicine was discontinued, and she was ordered decoction of aloes $\mathfrak{z}\text{ij.}$ t. d., and *pil. aloes gr. v. bis die.* In the course of a fortnight she returned, stating that she had three attacks during the last week, each of which had lasted for ten hours, with an interval of two hours between the first and second, and of twenty-four hours between the second and third. To continue the medicine. In the following week the intolerance of light occurred twice, and lasted for twenty-two and twenty-four hours respectively. She was now ordered bromide of potassium in ten-grain doses in decoction of cinchona; and as she complained of sleeplessness, she was directed to take half a grain of morphia at night. This, continued for three weeks, appeared to effect a cure; for she called six months after to say she had had no return of the complaint, and that she could see with the right eye as well as ever.

The two following cases appear to be examples of ptosis proceeding essentially from asthenia, and constitute

types of the affection, therefore, that are rather uncommon.

J. W., set. 28, came to the Hospital on the 15th November with ptosis of the left eye, dilated pupil, divergent strabismus with slight upward tendency, and double vision of fourteen days' duration. She was able to roll the eye slightly both upwards and downwards, but not inwards. A pallid blue-eyed woman, who had been married at seventeen, and had had eight children in ten years, the last six weeks previously. The labour was not a severe one; but she had suffered from severe headache, beginning a fortnight after the labour, and still continuing. Her pulse was extremely feeble, and her whole aspect was that of thorough anæmia. The fundus of both eyes was apparently healthy. She was ordered decoct. cinchon., tinct. cinchon., and liq. cinchonæ in a draught three times a day. On the 26th November the pain had considerably abated; the pupil of the left eye contracted to some extent both by direct and reflex light. There was no affection of the sensibility of the face of the affected side. She was now ordered the same mixture, with a little bichloride of mercury, $\text{m} \times \text{l}$., and a blister. On the 10th December the pupil was still strongly dilated, and the strabismus even more marked. She was now admitted into the Hospital, and at once placed on full diet, fifteen minims of the perchloride of iron, and ten grains of the sulphate of magnesia. She improved under this plan up to the 31st of December, though slowly; the pupil becoming somewhat smaller, and the power of turning the eye inwards being to some extent regained. At this time, having read Mr. Wharton Jones's work on *Railway Injuries*, I directed the solution of Calabar bean in glycerine to be instilled into the eye two or three times a week. Great improvement followed; and on the 17th January it was so considerable that the patient, at her own request, was discharged, with only the slightest degree of divergent strabismus remaining.

Double Ptosis.

A. V., set. 48, came to the Hospital with double ptosis. She was a poor wretched-looking woman, with a small pulse beating 84 times in the minute; and complained, besides the drooping of the lids, of pain, especially in the left temple and vertex, which sometimes became so severe as to cause her to faint. About seven or eight months ago a large stone fell upon her foot, which threw her down, and led to serious hæmorrhage from the vagina, with vomiting, besides causing some injury to the back. She became exceedingly debilitated, and suffered from loss of appetite. The ptosis is not quite complete, a small fissure being left between the lids. She is obliged, however, in order to see any object in front of her, to throw her head back. On raising the lids the vision was found to be good, and she read No. 3 of Snellen. The pupils were of average size, and acted with light naturally. The ptosis came on about three months after the accident, but she had been ailing during the previous three weeks. She was ordered a blister on each temple, and mixt. strychniæ c. ferro. In ten days considerable improvement took

place; the pain had disappeared, and she had gained some power over the lids. She ultimately almost entirely regained the power of raising the lids.

Intermittent and temporary Ptosis.

Henry S., æt. 27, July 11, 1870, states, that for some time past his right eyelid has been inclined to droop. About three weeks ago he received a severe blow on the left cheek from a fall; and soon after this the right eyelid fell for a time, but got well again, and then again dropped. There was slight internal strabismus on the left side. He was ordered a succession of blisters to the right temple, and a mixture containing strychnia and iron. In a few days improvement occurred, though the lid fell on exposure to bright sunlight, and he was then unable again to raise it. A continuance of the treatment, however, effected a cure in the course of some weeks.

It is not common to meet with cases of ptosis in young children from any cause. The following, however, is an instance of traumatic origin:

J. W. (834), æt. 9, applied at the Hospital with ptosis of the left eyelid on the 1st March. It had originated seven days previously quite suddenly, in consequence of the boy accidentally receiving a severe blow on the brow from the father. On raising the lid, it was seen that divergent strabismus ($2\frac{1}{2}^{\circ}$ Laurence's strabismometer) existed. The pupil was slightly dilated, but responded to some extent to the action of light, both directly and sympathetically. There was no modification of sensibility of the brow, lid, or cheek, nor any facial paralysis. He was ordered decoct. cinchon. $\mathfrak{z}\text{j.}$, liq. hydr. bichlorid. $\mathfrak{z}\text{j.}$ ter die, and an empl. lyttæ to the temple. On the 12th March he was able to raise the lid to a considerable extent by a strong effort, but it soon fell again. To continue the medicine and repeat the blister. On the 15th, the note made was—Decidedly improving; can raise the lid to nearly its natural position for a few seconds, and can bring the eye, which has up to this time been nearly motionless, to the middle line. March 19. The boy can raise the lid perfectly; but after a few minutes it slightly droops. He can rotate both eyes; but when looking fixedly at any object, the left eye slowly diverges. To continue the medicine and repeat the blister, and to bandage the right eye for a few hours daily, that he may bring the left into use. March 29. The ptosis has entirely vanished; the strabismus is still to some extent perceptible. May 17. Strabismus still visible; to keep the bandage applied for a week. May 31. Improving. June 28. Patient perfectly well; the eyes straight; no trace of double vision.

Ptosis.

965. J. B., æt. 48, came to the Hospital on May 7 with ptosis, well-marked external strabismus, and wide dilatation of the pupil of the right eye. The pupil was quite immovable; double vision was much

complained of; the affection had lasted a month; there had been a considerable degree of pain in the temple on that side; there was no disturbance of sensibility. After many weeks, during which various methods of treatment were tried, consisting of tonics, alteratives, and blisters, this man partially recovered, the ptosis disappearing towards the end of July; but the paralysis of the recti was permanent.

Ptosis (congenital).

M. J., æt. 11½, June 27, came to the Hospital with ptosis of the right eyelid, with which she had been born. There was no power of raising the lid at all. It had been operated on by Dr. Mackenzie, and it was not thought advisable to repeat the operation, as this had proved useless. No effect was produced by the passage of an electrical current.

The causes of exophthalmus are by no means always so clear as might be inferred from the statements made in books, and many forms of the affection are but little amenable to treatment. The following case appears to belong to that class that was carefully described by Mr. Prael some years ago, as probably arising from venous congestion:

W. D., æt. 40, applied at St. George's in August with protrusion of the left eye. He stated that eight years ago he was perfectly well; but whilst serving in the Cape he suffered a severe attack of inflammation, affecting first the left and subsequently the right eye. He never again saw well with the left, which protruded to a considerable extent. Five years ago he was at Netley, and the treatment pursued there led to the complete return of the eye to its natural position; but the sight still remained so impaired, that he could only just distinguish light from darkness. Eight days ago it began again to protrude. The pupils of both eyes were widely dilated. He could only see No. 70 Snellen at twenty feet. The lids of the left eye were swollen and red; the sclerotic intensely congested; the cornea hazy; tension of the globe nearly normal. On raising the lid, and telling the patient to look down, the large vessels in the sinus were found to be very much congested and tortuous, so as to resemble a varix. There was a good deal of pain, but this was relieved by the recumbent position. He was ordered a mixture containing aconite and colchicum and quinine. On examining the capsule of the lens of the right eye it presented numerous minute gray spots and dots; that of the left eye was also spotted and hazy. The fundus in both, however, could be seen, and was apparently healthy. The medicine produced no improvement; and on the 27th September he was admitted into the Hospital. In addition to the symptoms above mentioned, he complained of buzzing in the head, and a systolic bruit was audible over the temple. There was no apparent cardiac disease. The medicine was continued, and he

was kept in bed. On the 14th October he was much in the same condition. He stated that changes in the weather, and especially the occurrence of rain, affected him considerably, increasing the sense of fulness and pain. The condition of his right eye, however, improved, and he could soon read No. 6 of Snellen. On the 16th a large swelling was found to have formed on the outer side of the left eye, over which ramified two or three large episcleral vessels. He was now ordered the perchloride of iron in ten-minim doses; but this disagreeing with him, it was exchanged on the 20th October for calomel and opium in doses of two grains and half a grain respectively three times a day. On the 25th October the eye was smaller, and he could discern large objects. The mouth becoming tender, the medicine was exchanged for iodide of potassium. On the 30th the swelling was smaller. On the 7th November he was directed to apply cold applications constantly to the eye; and he immediately experienced advantage from them, the protrusion of the eye diminishing to a considerable extent. He was at length discharged much improved, but still with some protrusion, and complaining of a buzzing noise; the anæmic bruit was still audible over the temple.

Exophthalmus.

E. H., æt. 32, is married. The projection of the globes appeared about six months before her application at the Hospital. Both eyes are affected, and the protrusion of the globes is sufficiently great to give her a very unpleasant staring appearance, the sclerotic showing both above and below for a distance of at least an eighth of an inch between the margin of the cornea and that of the lids. She is unable to attribute the attack to any special circumstance, except that her rest was, at the time of its appearance, much broken, owing to the illness of her husband. It came on rapidly after bathing in the sea at Brighton, when she felt the water very cold, and was much chilled. Pain came on at times across her forehead; but she was and is quite regular both in regard to the catamenia and the state of the bowels. She has had no children. The tension of the eyes is natural. There is no fulness of the thyroid. She is not a thin woman, but of pallid complexion. The heart-sounds normal. Water healthy. At night her feet swell. The vessels of the sclerotic are slightly congested. Pupils large and active. On examining the fundus both disks appeared much congested, the retinal vessels numerous, large, and rather tortuous. She could read 8 of Jäger's test-types with the left eye, and 10 with the right, and 4 and 6 respectively with a + 60. This patient was first treated with digitalis and squills by one of my colleagues, and with strychnia and iron by myself, without, after several months' steady attendance, obtaining any marked benefit. Electricity still remains to be tried for her, though the prospect of advantage does not appear to be very great.

Exophthalmus.

E. M., æt. 39. The affection implicated the right eye only, and was said to vary to a considerable degree at different times. She first

noticed it about twelve or fourteen years ago, when she used to suffer from severe inflammation of the eye, that has recurred at intervals ever since. She is married, but has had no children. The bowels are confined, and she has frequent headache of a sharp stabbing character, not like the ordinary dull pain of headache. The projection of the globe is only moderate in amount. The tension of both globes is normal and equal. The pupils act well. Her vision is not very good in either eye, being only able to read 120 of Snellen at twenty feet with the left, and C at same distance with right. Heart-sounds natural; thyroid full. She was ordered the mist. potass. iodid. ʒj. ter die, and subsequently steel, with slight improvement, but was unable to remain long in the Hospital.

*Temporary complete loss of vision from exposure of the eyes
to a flash of lightning.*

C. P., æt. 30, a policeman, was on duty on April 15th at about two A.M., when a flash of extremely vivid lightning passed immediately before his eyes. His nervous system received a severe shock; he felt pain in his head, and immediately discovered that he was blind. He was brought to the Hospital the same morning. On examination the lids were found to be closed, and he was unable to raise them voluntarily. On raising the lids, the pupils were found to be somewhat dilated, with scarcely perceptible reaction to light; the eyes were otherwise, to all appearance, perfectly normal. The man stated he had no vision whatever. He was ordered a purge, and to remain in a darkened room. On the 18th he found, on waking, that he had reacquired the power of raising the lid, and also perception of light for a few minutes; but the former only lasted a few minutes, and on raising the lid with the finger, he found that this also had failed him again. On the 20th the man was able to see perfectly, and had no difficulty in raising the lids. A week after he came to the out-patient room, stating that when at all fatigued, and occasionally without obvious cause, in the course of the day his vision entirely disappeared for a few minutes. Mist. quinis was ordered him, and I did not see him again.

Purulent ophthalmia sometimes attacks a patient without obvious cause, and runs its course with striking and destructive rapidity. In such cases we can only conjecture that the eyes, or rather the eye—for it usually commences in one, and affects the other subsequently—has been poisoned; that gonorrhoeal matter, or pus from some other source, has been introduced into it; or, if we do not admit this explanation, we must suppose that inflammation has been primarily established in the eye from cold or atmospheric causes, and that such inflammation has assumed an evil type from debility or constitutional dis-

turbance. To what else can we attribute the violent onset and progress of such a case as the following?

Arthur M., æt. 15, states that on the 6th of October he was quite well; but that on the evening of that day, without any cause to which he could ascribe it, the right eye began to run with water. On the following day the discharge had become purulent, but there was no pain. The discharge continued to increase from day to day; but he had no medical advice, and did nothing for it until the 11th of October, when he applied at the Hospital. On examination the lids were found of a dark purple tint, and greatly swollen. There was so great an amount of chemosis, that only a small portion of the upper segment of the cornea was perceptible; the portion visible was hazy in appearance. There was no pain. The boy was poor, emaciated, and pallid, and was free from gonorrhœa. He was directed to go to bed, to wash the eye out every few minutes with a very weak solution of alum, to have full meat diet, and ℥iv. of wine, and to take mist. quiniæ ℥j., potass. chlorat. gr. x. ter die. On the 12th he was much better; the chemosis had to some extent subsided; the discharge diminished. The eye was ordered to be washed out occasionally with Condyl's liquid. For three or four days he continued to improve; but on the 18th, either from neglecting the removal of the matter, or from imprudent exposure to cold, a relapse occurred. On the 19th the lids were much swollen, with large veins coursing over them. The discharge was much more abundant; the chemosis very great, the folds being deep red and fleshy, instead of, as usual, merely œdematous; the cornea almost entirely concealed. He was enjoined to wash the matter sedulously away from the eye, and inject it with weak alum-lotion every half-hour. On the 22d careful examination of the cornea showed that though tolerably clear above, it was very white and opaque below, under cover of the chemosed folds. As it was obvious that the cornea was here sloughing, and there was no pain or tension of the eye, it was not thought expedient to puncture the globe. On the following morning the aqueous escaped through a minute aperture, but the chemosis remained stationary. He was now ordered decoct. cinchon. ℥j., quiniæ gr. ij., and liq. cinchon. ℥x. ter die. On the 25th the chemosis had begun to subside; the vision was found to be retained sufficiently to enable him to see large objects, as the hand waved before him. Soon the greater part of the cornea was visible; the ulcer was found to be of considerable extent, situated laterally, and to have a red centre, in consequence of the development of vessels from the subjacent and adherent iris. On November 1st a small button of vascular tissue had grown up from the base of the ulcer. This was touched once or twice with nitrate of silver; and he was discharged on the 13th of November with a small leucoma situated laterally, to which the inner margin of the pupil is attached, leaving the rest free. He can read No. 12 of Snellen.

In this case the question arises, whether it would not have been better to tap the cornea when first seen; but

it may be objected, that there was no indication of increased tension of the globe, and so much of the cornea as could be seen was only cloudy; and there was no evidence then of an ulcer: the main indications for treatment seemed to be cleanliness and support. If the relapse had not occurred, he would have escaped without damage. I once saw Mr. Stanley, acting under Sir W. Lawrence's advice, in a precisely similar case scarify the conjunctiva with four or five radiating incisions through the large chemotic folds. In that case the eye was entirely lost, the cornea sloughing throughout.

Sympathetic Ophthalmia.

The treatment of sympathetic ophthalmia is perhaps one of the most unsatisfactory subjects in the whole range of ophthalmic medicine. An injury to the cornea with a chisel, or, as often occurs, with the rebound of a chip of metal, is received; the aqueous is immediately discharged, and the iris is pressed against the posterior surface of the cornea. In the course of twenty-four hours the progressive opacity of the lens indicates that the capsule has been injured, or that the vitality of the whole organ has been destroyed by the shock. More or less severe iritis, irido-cyclitis, or general ophthalmia, supervenes; pain more or less persistent, and liable to great exacerbations, is experienced. After a time the patient begins to complain of the opposite eye: it waters, slight conjunctivitis is apparent, and the power of accommodation is weakened, so that a very brief attempt to read induces pain and inflammation. A week or two more, and irido-cyclitis is established in this eye also: the iris becomes dull, the aqueous turbid, or the pus is sufficiently abundant to form an hypopyon; the anterior chamber becomes flattened, the sclerotic round the cornea thinned, permitting the choroid to show through it; and by and by lymph is thrown out, which blocks up the pupil, accompanied with more or less, but sometimes with very little, pain; and, lastly, staphylomata occur around the cornea, and, with total extinction of vision, the eye bulges in various directions or undergoes a process of atrophy.

The tension of the globe is often not materially increased. The course of the affection is in many instances by no means steady or continuous, but rather by fits and starts: the redness diminishing for a few days, the vision somewhat improving, pain (if present) decreasing; then suddenly, without apparent cause, an exacerbation taking place, and all the previous symptoms returning with augmented violence, till vision is almost or entirely lost.

Now the chief difficulty that arises in determining the treatment to be adopted proceeds from the uncertainty of our prognosis. We are unable to forecast the probability of the occurrence of the sympathetic inflammation in the sound eye. Were we sure that it would occur, we should not hesitate to remove the injured eye as soon as it came under treatment; but every experienced surgeon has seen many cases where the cornea and sclerotic have been cut, and some where even the lens has been wounded, and yet in which all things progressed without material discomfort to the patient, and where the ultimate result has only been the loss or impairment of vision on the injured side. The position of the cut through the ciliary region has been stated to afford the best ground for determining the removal of the globe in the first instance. It has been suggested, that if, after an accident of this nature, the injured eye continues to be painful, the ciliary nerves at the painful spot should be cut by an incision made of the sclerotic; but in one of my own cases I removed the entire anterior half of the globe without any benefit resulting. Again, it has been suggested to remove the whole globe; and I have on two or three occasions performed this operation when the sound eye was already affected, but without, so far as I could observe, staying the course of the disease for one moment. If this operation is to prove successful, there can be little doubt that it should be performed at a very early period of the attack on the sound side. It has been stated by Moorens, that the sympathetic attack never occurs unless the injured eye is amaurotic, which, so far as my own experience goes, is perfectly correct. It appears to me therefore, that the circumstances which should guide us as

to the treatment to be adopted are, that if the injured eye be completely blind and be also inflamed, the condition of the sound eye should be carefully watched, and as soon as the previously sound eye betrays any failure in its power of accommodation, the entire globe of the injured eye should be extirpated. The following case is one of which I watched the course with much interest, and regret exceedingly I did not remove the eye at a still earlier period.

W. F., æt. 13, was admitted on the 2d July, having just previously run the prong of a fork into the right eye. The wound was situated at the upper and inner part of the sclerotic, about one-sixth of an inch from the margin of the cornea. The choroidal pigment stained the margins of the wound; the anterior chamber was full of blood. A drop of atropine solution was instilled into the eye, and a pad and bandage were applied. A purgative powder was administered. He was ordered two pints of beef-tea and a pint of milk daily with bread. On the 3d July the boy complained of considerable pain; the conjunctival vessels had become congested. He was ordered to apply two leeches, and to keep up the bleeding with a linseed-meal poultice; the solution of atropine to be applied daily. On the 5th July the blood had become sufficiently absorbed to permit the pupil to be dimly seen fully dilated. The leeches entirely removed the pain. July 12. Pupil dilated; blood in great part gone; lens opaque; no vision; the choroid forms a staphylomatous protrusion through the wound; the conjunctiva around it is sloughy; considerable inflammation of the conjunctiva generally. 16th. The lens, swollen by imbibition and pressing the iris forward, of a curious greenish colour. It was resolved to perform a large iridectomy and scoop out the opaque lens. This was easily accomplished, the lens, as might be expected, proving very soft. No pain or other symptom of inflammation followed the operation; no vision was obtained; the interior of the eye presented an unhealthy yellowish-green colour, entirely obscuring the fundus. 23d. Patient in same state. 31st. Suppuration has commenced, and is slowly progressing in the interior of the globe. The left eye is perfectly strong and healthy. August 11th. The boy complained of some watering of the left eye, with occasional pain, and the conjunctiva appeared slightly inflamed. As soon as these symptoms were observed, it was decided to extirpate the globe of the right eye; and the boy was ordered small doses of calomel and opium. 20th. The inflammation of the left eye has been steadily progressing up to the last two or three days, since when it has been stationary. He is still taking the pills. The vision of the left eye is seriously impaired, as he can scarcely make out C at two feet. 25th. Has been improving lately; suffers no pain; the left globe is soft; the sclerotic injected; the iris dull; the pupil small, and not reacting to atropine. September 17th. There has been very little alteration during the last fortnight. He can count the one-inch test-dots at one foot. To continue the pills once

a day. On the 29th September, a sudden exacerbation of the inflammation occurred. The iris became much more dull, the aqueous turbid, the upper segment of the sclerotic became thinned, and several staphylomatous protrusions formed, arranged concentrically to the upper border of the cornea. There was, however, no pain, and the tension of the globe was not increased; vision limited to the movement of large objects. A consultation was held with Mr. Pollock and Mr. Rouse, and it was determined that an iridectomy should be performed the following day. After the consultation, however, I ordered the boy to take two or three doses of turpentine, twenty minims for a dose. The effect was immediate and striking. On the 1st October he expressed himself as being greatly improved, and said he felt each dose acted on the eye. The inflammation had manifestly subsided, and he said he saw more distinctly; whilst the lachrymation and photophobia, which had previously been considerable, diminished. On noticing this improvement, the operation was postponed. October 14th. Improvement steady and continuous; can see large objects at the other side of the ward, but is unable to read CC of Snellen's test-types; the iris very dull and the pupil blocked with lymph, which is not of uniform thickness; intolerance of light and lachrymation have passed away; the globe is not tense. November 22d. Patient came as an out-patient. Can only just discern light; the globe is somewhat shrunk, the cornea pretty clear; the sclerotic of a dull livid tint, the staphylomata at its upper margin increasing in size; the iris of a dull reddish colour, evidently quite disorganised; the pupil almost obliterated, and clogged with lymph.

Emma P. (205 Cholmondeley), æt. 18, admitted October 29, 1869, with injury to the left eye. About a week ago she ran the prong of a fork into the left eye, piercing the point of junction of the cornea with the sclerotic at the lower part of the eye. The pupil on admission was pear-shaped, with the iris protruding and vision misty, with considerable lachrymation and intolerance of light. She could see C of Snellen. The lower portion of the conjunctiva and sclerotic presented a considerable amount of redness. She was ordered to remain at rest in bed, to have a drop of a two-grain solution of atropine dropped into the eye, and to have a compress bandage applied. On the 5th of November, the inflammation having subsided to a considerable extent, the protrusion, which was of about the size of an ordinary pin's-head, was touched with nitrate of silver. On the 11th it was nearly level, there was no opacity of the lens, and all symptoms of inflammation of the conjunctiva and sclerotic had disappeared. She was discharged in the course of the following week with perfectly good vision, and no inconvenience beyond the slight elongation of the pupil.

Specific Gonorrhæal Iritis.

Examples of gonorrhæal iritis are extremely rare, and the following case, which I am disposed to believe was a genuine case, is on this account worthy of being placed on record.

James H., æt. 39, came to the Hospital suffering from iritis of the right eye, on May 13, 1870. He stated that he was then suffering from gonorrhœa, which he had contracted four days after Easter. The discharge was full yellow, but scanty in quantity. The eye was perfectly well up to Monday, four days ago. In the afternoon of this day he was working in a dark passage, when he suddenly felt as though his eye had been struck by a flash of lightning. Light immediately became painful, and this intolerance of light has gradually increased each day since. There is now a feeling of gravel in the eye, preventing sleep. His occupation is that of a bricklayer, and he had been working all day in the dark passage; there was no draught in it. Eighteen months previously he had been in the Hospital with a severe attack of gonorrhœal rheumatism, chiefly affecting his ankles and knees. When the attack in the eyes commenced he was and still is under treatment at the Hospital for gonorrhœa, the treatment adopted being the alkaline. On examination the conjunctival and episcleral vessels were found to be deeply congested, and of a purplish colour, the circumcorneal zone being not very well defined; the iris was brown, with its markings obscured from effusion; and the pupil dull, small, and scarcely, if at all, responding to variations of light. The inner free margin of the iris presented a thin white border of lymph; tension not perceptibly increased; the globe tender to the touch; only quantitative perception of light remaining; no pain except at night. The instillation of atropine produced no effect in dilating the pupil, and the media were too turbid to permit an ophthalmoscopic examination to be made. He was ordered a grain of calomel and the same quantity of opium and of quinine every six hours. On the 16th vision was stated to be a little clearer, the inflammatory symptoms subsiding. Under a continuance of this treatment steady improvement took place; and on the 10th of June only slight congestion was reported to be present, and on the 17th he could read No. 6 of Snellen, the only complaint being that a few muscæ and cobwebs lingered about the eye.

The following case exhibits a very unusual course and termination of rheumatic ophthalmia.

Mrs. H., æt. 30, previously in tolerably good health, was attacked on the 7th October with violent pain in the right eye. She applied at the Royal West. Ophthalmic Hospital, where I first saw her, and recommended her to come in. This she declined. There was then intense iritis, and her vision was greatly impaired. Three leeches and a linseed-meal poultice were ordered, with atropine solution in the eye. I saw her on the following day, when the pain was still very severe and no improvement perceptible. She then requested to be admitted into St. George's. The treatment was altered to mist. quiniæ and mist. aconit. c. colchico, aa ʒss. ter die. The leeches were reapplied. On the 14th an attack of rheumatic inflammation occurred of a very severe nature in the right knee and ankle and in the left shoulder. Dr. Ogle saw her, and ordered hot fomentations to the parts affected, with fifteen minims of hydrate of chlorat. five minims of spirit of chloroform, and

two ounces of water : a teaspoonful to be taken frequently. Careful examination and inquiry failed to elicit any history of syphilis ; she was married, but had had no children. Two days afterwards a new affection appeared to be grafted on the primary iritis : the conjunctiva became much chemosed, profuse discharge occurred, and the inflammation appeared to extend to the deeper tissues of the orbit, as the globe began to protrude and the lids to assume a deep purple tint. Notwithstanding the application of leeches, of warm poultices and fomentations, and general treatment, very little improvement occurred. On the 23d October the note made was—Still considerable general ophthalmia : pupil obscured with lymph ; iris green ; aqueous turbid ; chemosis ; protrusion of the globe ; abundant discharge ; severe pain ; tongue foul ; bowels open, but no appetite ; pulse weak. She was now ordered a grain of opium and one of calomel three times a day, with two pints of beef-tea and a little wine. On the 25th she was manifestly worse—more pain, weaker, and with a small quantity of pus in the anterior chamber ; vision altogether gone. The opium ordered to be continued, but the calomel to be omitted. On the 28th the hypopyon had disappeared ; and on this and the three following days amendment, so far as the eye was concerned, took place—the chemosis subsiding, the eye receding, and the pain diminishing. On the 5th of November a relapse occurred, all the symptoms in regard to the eye returning with great intensity. The general symptoms of rheumatism, I ought to mention, had never entirely left her, attacking with great violence first one joint and then another. On the 7th the lids, especially the upper one, almost appeared as though about to develop an abscess, being much swollen and red, with great chemosis of the conjunctiva and protrusion of the globe. The globe was very tense. At this period iridectomy was proposed, but the patient declined. Vision was reduced to the quantitative perception of light. She was taking eight ounces of wine per diem and two pints of beef-tea, but rejected almost all solid food. The medicines ordered her by Dr. Ogle, who saw her frequently, were quinine, with small doses of iodide of potassium and morphia, every six or eight hours. She continued almost *in statu quo* till the 15th November. At this time I determined to try the effect of cold-water dressings frequently applied to the eye in reducing the swelling, and was pleased to find that she immediately received great benefit from them. The pain diminished, the lids and conjunctiva became much paler, and the globe receded. On the 27th of November the condition of the eye was—the globe shrunk and slightly squared ; sclerotic of a slightly yellowish hue ; no conjunctival congestion ; cornea contracted in diameter ; iris greenish ; pupil very small, occluded with lymph ; anterior chamber very small, the central portion of the iris bulging forward as if by a swollen lens ; no pain. After staying a few days longer in the Hospital, she left for her own home in Gloucestershire.

The following is interesting as furnishing an illustration of a not very common termination of retinitis.

J. H., æt. 41, a clerk, married and living at Brompton, was seized

on the 20th December 1868 with a sudden dimness of the left eye whilst reading the paper after breakfast. The dimness appeared in the form of a dark disk the size of a farthing, which occupied the axis of vision. Up to the moment of the attack he had been quite well, and had led a particularly regular and steady life, and he could in no way account for the attack. He experienced no pain nor other symptom that he remembers, beyond the sudden dimness. On the following day the eye watered considerably, and he began to have headache; the disk 'bothered him' in all his work, and the eye began to swell. Finding he was gradually getting worse, he applied at Moorfields, and came under the care of Mr. Hutchinson, who made the following note on the margin of his letter: 'Retinitis, extravasation of blood at yellow spot, detachment of retina, counts fingers.' (The man states that, though he counted the fingers, he was only able to see the tips, the palm being quite obscured.) 'The extravasations are numerous, and one is large.' Mr. Hutchinson ordered him pulv. jalap. co. 3ss., empl. lyttæ. mist. quiniæ, and to be admitted. Almost immediately after this severe pain came on in the eye, to relieve which he applied poultices and hot fomentations. For some reason he was not able to obtain admission into the Moorfields Hospital, and after waiting a week applied at St. George's. Jan. 6th. On admission there was great projection of the globe. The separated lids were much swollen and of a deep purple tint; there was great chemosis, the lower segment of the cornea being only just visible between the folds. What can be seen, however, is clear, or presents only a slight haze. The anterior chamber is partly filled with puriform lymph. The pain over the brow and in the temples is intense and constant. He was ordered full doses of morphia, and told that the removal of the globe was the only measure that could be adopted. To this he consented; and the following morning it was extirpated. In the act of removal, the sclerotic near the margin of the cornea gave way in several places, pus and bloody sanies welling up in all directions. The relief from pain was immediate and complete; and the farther progress of the case requires no comment, except to state that he was discharged on the 20th of January, well. On examining the globe, it was found that the sclerotic was remarkably softened. The choroid was easily separable from it, and did not appear to be materially altered. Lining its under surface, however, was a dense layer of lymph, which could not readily be detached from it, and which seemed to be the retina infiltrated with pus. Under the microscope the membrane presented innumerable small cells, with scattered fragments of the retinal structures. The vitreous had been in great measure evacuated in the removal of the globe, and had undergone purulent infiltration and degeneration.

The two subjoined cases demonstrate the advantage that may be obtained by a trifling operation when the lower lid is everted:

Eversion of the Lids.

H. L. was admitted for eversion of the right lower lid from a boil on

the cheek, which must have been of very large size, as the cicatrix is large and irregular. A similar operation was performed as in the preceding case, and with a like result. A cut was made on the 16th Feb. along the lower lid, quite down to the conjunctiva; this was seized with forceps, transfixed by needles and silver wire, and looped up towards the forehead, where the ends of the wire were secured by pieces of plaster. The cutaneous wound was then closed by several sutures, and a pad and bandage applied. On the 23d March the wound had quite healed, and the surfaces of the ocular and palpebral conjunctiva in contact. On the 12th April slight retraction had taken place, but the eversion was almost completely cured.

Mary P., æt. 39, was admitted into the Hospital on the 29th Sept. for eversion of the lids of the right eye, the consequence of a severe burn caused by falling into the fire whilst in an epileptic fit. The skin of the forehead and cheek had been extensively burnt, and now presented puckered cicatrices. The lower lid was everted to a considerable extent; the upper to a less extent, and chiefly at the outer part. Vision was perfect, and there was no affection of the ocular conjunctiva. An elliptical incision was made, parallel to the border of the lower lid; from the centre of this a perpendicular incision was made, and the triangular flaps freely dissected back. The dissection of the tissues subjacent to the horizontal line was continued till the under surface of the everted conjunctiva was reached; a fold of this was seized with the forceps and brought down, the traction thus exerted causing the lid to resume its natural position. The apices of the triangular flaps were then transfixed with two silver wire sutures, together with the fold of conjunctiva that had been brought down. A lint pad was applied, and a wide piece of strapping attached to the skin over the jaw and masseter muscle; this was brought over the pad and eye and fixed to the forehead, so that the whole cheek was to some extent drawn up. Four days afterwards the dressings were removed, when it was found that the apices of the flaps had sloughed, being composed chiefly of cicatrised tissue. Nevertheless the wire sutures, the extremities of which had been left long, and had been turned up on the forehead and fixed with adhesive plaster, so as to exert considerable traction, still held. On the tenth day the lid was in perfect position, the wound had healed up to the size of a split-pea; the sutures were removed, but the cheek was still supported by a compress and strapping. One month after the operation she was discharged, with the eyelid in contact with the globe throughout its whole extent, proving a very satisfactory result.

Table of Cases from Dec. 1, 1868, to Nov. 30, 1869.

Nature of disease.	Dec.		Jan.		Feb.		March.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Total out-patients.		Total in-patients.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Diseases of the Orbit :																													
Abscess in . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
Exophthalmus . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	.	.	1	1	.	.
Diseases of the Muscles and Neuroses :																													
Ptosis	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	1	.	1	8	.	1	.
Paralysis of 3d nerve . . . . .	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
" " 8d and 7th do. . . . .	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Hyperæsthesia of lachrymal . . . . .	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Affection of sympathetic . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.
Neuralgia . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.	1	1	.	.
Strabismus convergens	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	5	10	8	5	.	
" " divergens . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	.	.	.
Diseases of the Lachrymal organs :																													
Obstructed ducts and lachrymal abscess	1	1	2	2	2	2	.	.	.	3	4	.	1	.	2	1	3	1	.	.	1	.	3	11	18	2	1	.	
Lachrymal abscess after scarlatina . . . . .	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ditto after smallpox . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.
Epiphora	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Affections of the Lids :																													
Blepharitis	1	1	1	.	.	1	.	.	1	3	.	.	.
Hordeolum	1	1	.	.	3	2	3	2	3	4	1	2	1	2	1	1	2	1	1	1	1	1	1	3	8	6	.	1	
Ophthalmia tarsi	1	3	1	.	3	2	3	2	3	4	1	2	1	2	1	1	2	1	1	4	5	4	3	4	25	29	1	2	

Affections of Lids—(cont.)															
Blepharospasm	1	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Tylosis . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Tarsal tumour	1	.	2	.	1	.	.	.	.	.	.	.	.	6	3
Sebaceous tumour . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Erysipelas of lids	1	.	.	.	.	.	.	.	.	.	.	.	1	1	1
" face . . . . .	.	1	.	.	.	.	.	.	.	.	.	.	.	1	4
Ecsema of lids	1	.	.	.	1	.	.	.	.	.	.	.	.	1	1
" face . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
" head . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Herpes . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Lepra . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Abcess	1	1	.	2	.	.	.	.	.	.	.	.	.	4	1
Verrucae . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Granular lids	1	.	.	2	1	.	.	.	.	.	.	.	.	4	1
True trachoma . . . . .	.	.	1	.	.	.	.	.	.	.	.	.	.	1	1
Trichiasis and distichiasis	1	1	1	.	.	.	.	.	.	.	.	.	.	2	6
Ectropion . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Entropion . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2
Injury to lids	1	.	.	.	.	.	.	.	.	.	.	.	.	2	1
Diseases of Conjunctiva:															
Conjunctivitis simplex	2	5	4	5	1	3	8	2	3	4	7	4	1	7	62
" chronica	1	.	.	.	1	1	.	1	1	1	1	1	1	1	8
" catarrhalis . . . . .	.	.	.	.	1	1	1	1	2	2	1	1	1	2	9
" muco-purulenta . . . . .	.	.	.	.	.	1	1	2	2	2	1	1	1	3	9
" phlyctenular	2	2	.	2	1	1	1	4	1	2	2	2	1	2	16
" purulenta neonatorum	1	.	1	.	.	.	.	.	1	1	1	1	1	4	27
Chemosis . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Pterygium . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
Diseases of the Cornea:															
Keratitis	1	.	.	.	.	.	.	.	.	2	2	1	.	4	8

Nature of disease.	Dec.		Jan.		Feb.		March.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Total out-patients.		Total in-patients.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
Diseases of Cornea—(cont.)																													
Keratitis, superficial	1	1	2		1		1				2	1	1						2		2		1	3	12	1	3		
" strumous					1																			1					
" chronic interstitial.	1						1																	1					
Pannus	1	3	1	3	1	2	4	5	3	6	3	4	4	2	2	2	5	5	7	11	4	2	4	85	49	10	9	1	
Ulcer on cornea	1	3	2		2	6	1	4	1	1	1	1	5	1	1	1	1	1	1	2			2	17	18	3	3		
Nebula	3	2					1							1	1	1	1	1	1					3	8	1	2		
Leucoma	1												1						3					8	3	2	1		
Hypopyon														1	2				1	1				1	1				
Staphylococci																													
Diseases of the Sclerotic:																													
Episcleritis																													
Scleritis and rheumatic ophthalmia							1																						
Staphylococci	1		3	1		2			1		2	1	1		1	3	2		1	1	1	1	2	12	11	3	8		
" posterior			2	1			1				1	1	1											2	4	8	1		
Diseases of the Iris:																													
Iritis	1	1			2		1		1							2			1	2				6	5	6	3		
" rheumatica					1				1			1	2						1					5	1	1	2	2	
" syphilitica							1																	1	1	1	1	1	
Irido-cyclitis																									1	1	2		
Synechia anterior																									1	1			
" posterior	1				1		1								1	1			1					2	8	2			
Atresia																			1										
Mydriasis													1																
Myosis													1													1	1		
Myocephalon																		1											
Prolapsus iridis																													
Displacement of pupil from blow									1																		1		

[illegible]

Table of Cases from December 1, 1869, to July 25, 1870.

Nature of disease.	Dec.		Jan.		Feb.		March.		April.		May.		June.		July.		Total out-patients.		Total in-patients.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Diseases of Muscles and Nerves:																				
Ptosis.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Paralysis of 8d.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
" 6th.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Neuralgia.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Strabismus convergens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
" divergens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Diseases of Lacrymal organs:																				
Obstructed ducts	2	.	.	.	.	.	.	.	1	1	.	.	.	.	1	1	6	5	.	1
Lacrymal abscess	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.
Affections of Lids:																				
Blepharitis.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Hordeolum	2	2	.	.	1	1	2	2	1	1	.	1	.	.	.	.	4	5	.	3
Ophthalmia tarsi	1	.	1	.	.	.	1	1	3	4	2	2	3	1	2	3	15	14	2	2
Tylosis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Tarsal tumour	.	.	2	.	.	.	1	1	.	2	1	3	.	.	1	1	2	6	.	.
Purulent ophthalmia	2	.	1	1	1	1	.	.	1	1	.	.	.	.	1	1	2	6	.	.
Tennis tarsi	1	2	2	1	3	1	1	4	.	1	1	.	.	.	1	1	8	8	.	2
Erysipelas of lids	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
" face	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.
Eczema of lids	.	.	1	.	1	1	.	.	.	.	.	.	1	.	.	.	2	1	.	1
Abscess	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Verrucae	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.
Granular lids	1	.	1	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.
True trachoma	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Trichiasis	.	1	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	3	1
Distichiasis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Ectropion	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.

[illegible]

Nature of disease.	Dec.		Jan.		Feb.		March.		April.		May.		June.		July.		Total out-patients.		Total in-patients.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Affections of Eyeball— <i>(continued)</i> .																				
Burns . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Punctures . . . . .	.	.	2	1	.	1	2	.	.	.	1	.	.	.	1	.	3	.	2	1
Diseases of Refraction and Accommodation :																				
Myopia	1	1	1	2	.	3	2	1	.	1	.	1	.	1	.	1	4	8	1	.
Hypermetropia	1	.	.	.	1	.	.	.	.	.	.	.	1	2	.	4	2	.	.	.
Asthenopia . . . . .	.	.	.	2	.	.	.	1	.	.	.	.	1	.	1	.	.	5	.	1
Astigmatism . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Nystagmus . . . . .	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	2	.	1
Ananosis . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
General Diseases :																				
Asthenia . . . . .	.	.	.	.	.	2	.	.	.	2	.	.	.	.	1	.	.	5	.	.
Retinitis albuminurica	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Operations :																				
Abscess of eyelids, &c.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Strabismus . . . . .	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	1	2	5
Lacrimal abscess . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2	1
Iridectomy . . . . .	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	2	.	1
Extraction of lens	2	.	.	.	.	.	1	.	2	.	1	.	.	.	.	.	6	.	.	5
Puncture of globe . . . . .	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Excision of eyeball . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.	.
Pterygium . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
Amblyopia	1	4	4	2	.	2	1	.	1	.	1	.	1	1	3	.	6	14	6	6
Lupus-non-exedens . . . . .	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	1
Inflammation . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	3	.	1	.
Ptoxis . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Ectropion . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Breaking up capsule . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	1
Syndectomy . . . . .	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1

HENRY POWER.

XX. REPORT OF THE OPHTHALMIC DEPARTMENT

FROM OCTOBER 1870 TO FEBRUARY 1871.

IN consequence of the resignation of Mr. Power, the charge of the Ophthalmic Department of the Hospital devolved upon the present writer only very shortly before the commencement of the winter session of 1870; and a variety of circumstances rendered it impossible for him, during the first few months of holding office, to keep those precise records of cases on which alone an accurate and comprehensive report can be based. In future volumes it is hoped this deficiency of necessary material will no longer exist; and in the mean while there remain many general facts of interest to which attention may be called on the present occasion.

The number of new cases taken under treatment during the five months between the 1st of October 1870 and the 28th of February 1871, amounted to 319 — of whom 72 were in-patients, and 247 were out-patients. Within the same period the operation of iridectomy was performed 29 times; cataract extraction, 9 times; removal of the eyeball, 7 times; besides numerous operations for squint, ingrowing eyelashes, and other minor matters, not requiring admission into the Hospital. The cases treated included 45 of inflamed or ulcerated cornea, 34 of blepharitis, 18 of injury, 12 of iritis, and examples of nearly all the affections of the eye that are ordinarily met with in the course of practice.

The cases in which *iridectomy* was practised fall naturally into two categories, accordingly as the object of the operation was to diminish tension of the eyeball, or to admit the passage of light through a clear portion of the cornea in cases in which the centre of that membrane had been rendered clouded or opaque by disease. In the

former class there have been a few instances of sub-acute and of simple glaucoma; but the majority of the cases treated for the diminution of tension have been examples of chronic inflammatory processes affecting the optic nerve or the deeper membranes, especially the choroid; and in which the hardness of the eyeball, although not so excessive as directly to endanger the integrity of the retina, has still been sufficient to check alike the free entrance of the arterial and the free exit of the venous current. In such instances a large piece of iris has been excised quite to the ciliary margin; in the hope that a softer eyeball and an uncompressed vascular system would lead to improvement in the general nutrition of the organ, and would promote the natural processes of repair. The consequent amendment can at best only be very gradual; and sufficient time has not yet been afforded for the complete development of the ultimate results. It may be said, however, in a general way, that more or less evidence of improved nutrition has been displayed in the majority of the cases (notably in one by an arrest of the commencing formation of cataract), and that in none has there been any mischance in connection with the operation.

The performance of iridectomy in the second class of cases has been called for by very various conditions. In some of the instances there has been almost complete blindness, depending upon the adhesion of the pupillary margin to the cicatrix of a central ulcer of the cornea. This was seen in two very young infants, who had been the subjects of purulent ophthalmia immediately after birth, and in both of whom both eyes were affected, and were operated upon with good results. In patients more advanced in life, the ulcer has frequently been a result of injury. But besides these, iridectomy has also been practised in many instances in which there was only haziness of the superficial layers of the cornea, due either to general keratitis or to bygone corneal herpes or recurrent vascular ulcer. In instances of the latter kind it is found that, independently of the improvement in vision consequent upon placing the pupil behind a transparent

portion of the cornea, the abolition of the sphincter pupillæ, probably by removing a constant source of traction upon the periphery of the cornea, almost always destroys the tendency to the return of the original affection. In cases of general corneal haziness, predominating in the centre, it is almost always possible to find some comparatively clear portion behind which a new pupil may be made; and the resulting diminution of tension, on the grounds already mentioned, promotes absorption of the opacity. In many of these cases the opacity would be in great measure absorbed in course of time even if no iridectomy were performed, and a certain amount of vision would be restored; but in the case of children or young persons belonging to the working classes, in whom the short time available for education might be wasted, or with whom the necessity to begin earning money is imperative, it is seldom desirable to wait for a natural cure when art is able to hasten the process. The piece of iris excised may be very narrow; and the small gap left by its removal is but a trifling evil when compared with the results of even two or three years of comparatively defective vision.

The operations for *cataract* have all been extraction by Von Gräfe's method of peripheral linear section, the nucleus of the lens being removed from the eye by properly-directed external pressure, without the employment of hook, scoop, or other form of traction instrument. In five eyes the cases presented no peculiarity; but were examples of ordinary senile cataract, sufficiently mature to be removed without hesitation, and leading to immediate and good recoveries, with normal vision. In one case the patient was a man not yet forty years of age, who was stopped from working at his trade by cataract, which rapidly became mature in his right eye, while at the same time a few striæ and general nuclear dimness became apparent at the left. He came under the care of the writer, in the first instance, at the Royal South London Ophthalmic Hospital, where the right eye was operated upon. The man had a great fear of chloroform, and did not take it. His superior rectus muscle strove

energetically against the fixation forceps by which the eye was rolled downwards; and the result was, that the hyaloid membrane was ruptured, and a certain quantity of vitreous escaped. On account of this accident, a portion of cortical matter was left in the eye; and although it neither retarded healing nor set up irritation, it remained as a flocculent mass in the centre of the pupil, undergoing slow but manifest absorption, but giving no prospect of useful vision prior to the lapse of three or four months. It therefore became a question for consideration whether it should be removed by a second operation, or whether the lens should be removed from the left eye without waiting for the complete degeneration of its cortex. This course was decided upon; and the patient was admitted into St. George's, where the capsule of the left lens was punctured with a needle and the pupil kept fully dilated with atropine. A second and a third puncture were made at short intervals; and after the lapse of ten days from the first, the cortex being generally opaque and flocculent-looking, and the eye a little irritated by the swelling of the lens, extraction was—though, warned by previous experience, chloroform was insisted upon—performed in the ordinary way; the cortex escaped with the aqueous humour on completion of the section, the nucleus followed it on very slight pressure, and the healing was speedy and complete. A fortnight after the operation the man read brilliant type easily; and in a short time, being provided with the necessary spectacles, he returned to his occupation. When last seen, the cortical substance left in the right eye had nearly disappeared, and the vision of this eye also promised to be perfect.

The method here practised, of artificially hastening the maturation of cataract by needle punctures, so as to allow of an earlier extraction operation than could otherwise prudently be undertaken, is a resource of great value in the tardily-forming cataracts of persons whose increasing dimness of sight may deprive them of the power of earning the necessaries of life, as well as for others in better worldly circumstances, but upon whom the anxie-

ties due to impending blindness operate prejudicially, by interfering with sleep and with general bodily nutrition. But it is a resource that is by no means free from risks of failure, and that should only be employed with great circumspection, and in carefully selected cases. It is imperatively necessary that the patients should be kept under constant observation, and protected from injurious external influences, atmospheric or other, from the time that the first puncture is made; and it is at least highly desirable that the pupil should admit of being brought to a state of maximum dilatation by atropine. If the latter condition be not fulfilled, there will be danger of an outbreak of iritis that it may not be easy to control; and it is obvious that the lapse of a few days without surgical inspection might afford opportunity for the development of the most serious morbid changes. Even when all precautions are observed, the practice is attended by dangers from which ordinary extraction is wholly free.

A countryman was admitted into the Hospital, aged about 40, in whose left eye a partially opaque lens had undergone dislocation, and was exciting irritation as a foreign body. In the right eye there was a very curious partial cataract, certain portions of the lens being densely opaque, while other portions were perfectly transparent. The opacity was not radiating or striated, but complete, and apparently homogeneous, and separated from the transparent part by an irregular indented line, generally horizontal, but running rather upwards on the nasal side. The superior part of the lens was transparent, but in the ordinary state of the pupil was almost entirely covered. An attempt to remove the left lens failed, the lens slipping back out of a scoop when partially extracted; and the eyeball underwent softening and atrophy. The capsule of the right lens was then punctured, as in the case last mentioned, and extraction afterwards performed. A considerable escape of vitreous followed the nucleus, some cortex was left behind, and a portion of hyaloid membrane prolapsed into the section. There was but little reaction, and the wound healed readily. The soft matter slowly underwent absorption, leaving a film of false membrane to be torn through at some future time, with every prospect of a good result. But the patient was very dyspeptic, anxious, and home-sick; and as it was thought desirable to postpone the final operation, he wished to spend the intervening time at home. He left the Hospital, and has not yet returned.

In all cases in which trouble is to be anticipated from the adhesive character of the still-transparent cortex, the surgeon has the additional resource of extracting the len-

ticular system in its entirety, the lens in its unbroken capsule. But a transparent cortex generally implies a condition of rather firm connection between the hyaloid and the posterior capsule, and there is then constant liability to loss of vitreous prior to the escape of the lens. When this happens, or when the lens resists moderate pressure, it becomes necessary to use traction instruments; and the operation has then been followed in some instances by inflammation and cell-proliferation in the vitreous itself, causing turbidity that only very slowly disappears. Moreover the extraction in the unbroken capsule requires a very large iridectomy, likely to be productive of dazzling and imperfect vision; and it also requires a rather large external section, which increases the risk to the cornea. On the whole, therefore, the dangers of this method are probably greater than those of puncture as a preliminary to extraction; and its advantages in respect of saving time and of perfection of vision are only obtained when the course of events is altogether without accident or complication.

The seven operations for *removal of the eyeball* were required, in two cases on account of ossific deposits in the choroid as results of past inflammation; in two cases on account of recent severe injury; and in the remaining three on account of sympathetic irritation of a sound eye by one that had been left morbidly tense and sensitive after disease destructive to vision.

The most remarkable case of ossific deposit in the choroid was in the left eye of a little girl, ten years of age. She had been the subject of double congenital cataract; and had been operated upon with a needle early in life at a provincial eye-hospital. It was stated that she had been exposed to cold after one of the operations upon the left eye, and that it became inflamed. Vision was wholly lost, and the vision of the right eye was very imperfect, the child being just able, with a three-inch lens, to decipher capital letters a third of an inch in height. An extremely delicate film of membrane was discovered behind the pupil, and was lacerated by two needles; so that there was no obstruction to the passage of light, and the details of the fundus could be clearly seen with the ophthalmoscope. Notwithstanding this, vision was very little improved; and the defect was manifestly due to faulty development or acquired hebetude of the retina. The blind left eye was somewhat smaller than its fellow, the conjunctiva pearly and natural

in aspect, the cornea perfectly clear, the iris of normal fibrillation, the densely black pupil partly occupied by a small white mass of enfolded capsule. There was no pain or tenderness, and no perception of light; and the eyes being naturally of a flattened (hypermetropic) shape, and lying rather deeply in the orbit, the finger did not reach sufficiently far back to discover any unnatural hardness behind the equator. The case was shown to Dr. Liebreich during a visit that he paid to the Hospital, and he suggested the removal of the blind eye, as a possible source of mischief to the other, and a hindrance to the nutrition of its retina. This suggestion was acted upon; and the posterior hemisphere of the enucleated eyeball was found to be of bony hardness, and, when opened, to contain a shell of true osseous formation, developed in the usual way from exudation on the inner surface and in the capillary layer of the choroid. How far this adventitious bone might so influence the ciliary nerves in their passage over it as to cause irritation capable of being conveyed to the other eye, must remain a matter for conjecture.

In the second case of bony deposit the symptoms of sympathetic irritation were well marked, and were at once relieved by enucleation. The patient was a man *æt.* 49, and the sight of his blind eye had been lost many years, from disease of which he could give no history, but which seemed to have been inflammation affecting the cornea and iris as well as the deeper membranes. He had recently commenced to suffer from dim vision and frequent lacrymation of the sound eye—symptoms that were daily increasing, but not attended by any evidence of objective change. The blind eye, when removed, was found to have the inner surface of the choroid studded over with bony scales, seemingly growing from independent centres, and tending to coalesce. The lacrymation and dimness ceased within twenty-four hours after removal of the blind eye, and the patient went home cured.

In the two cases of *injury to the eyeball*, wasting was following a considerable external wound in the ciliary region; and the excision of the globe was practised only in order to remove a source of future danger, and before any symptoms of sympathetic mischief appeared. In one of these instances we had a noteworthy and gratifying example of professional unanimity, worthy of being placed on record. The sufferer was kept for three or four weeks under observation as an out-patient, although he had been told from the first that removal of the eye would probably eventually be required. When at length he was advised to become an in-patient, that the operation might be performed, he consented without a murmur. It afterwards appeared, that the period of his attendance as an out-patient had been employed in seeking advice at every

ophthalmic hospital, or ophthalmic department of a general hospital, of which he could hear in London; and that the same opinion was given to him at each institution that he visited. He accepted letters of admission from many of them; but as he could nowhere obtain an opinion that his eye should not be removed, he returned after all to the Hospital at which he had in the first instance sought relief. The story has its ludicrous side; but it nevertheless affords very pleasing evidence of the comfort of mind that a poor man may derive from the existence of several hospitals. The rich will seldom submit to the loss of any part of the body without assuring themselves, by consultations with different authorities, that the step proposed is indeed necessary; and it would be hard to deny the same kind of satisfaction to those who may be less able to obtain it in the ordinary way.

Generally speaking, among the labouring classes the removal of a blind eye is to be advised, even when it neither is, nor is likely to be, a source of irritation to the other. The reason is, that persons actively moving about among tools, machinery, or the bustle of active handicrafts, are instinctively protected by vision against many dangers of which they take no conscious note; and it thus happens that, when an eye becomes blind after the habits of life are formed, it is very frequently injured by some accidental collision. The patient forgets his blind side, and moves his head without hesitation in the direction in which he sees no obstacle. By removing the eye the risk of collisions is not diminished; but the risk of the eye itself being hurt, and thus becoming a source of danger to the sound one, is of course entirely obviated. Labouring men migrate from place to place in search of work, pass away out of reach of skilled surgical attendance, or if they injure a blind eye, think but little of the matter, and are unwilling to 'lose time,' as they would phrase it, in seeking advice for an injury of which they do not conjecture the possible consequences. In this way sympathetic ophthalmia is not unfrequently lighted up; and when once this is the case, it is usually too late to arrest the mischief. Persons of education and intelligence

may be safely trusted with the custody of a blind eye, if they are made to understand the possible dangers that its presence involves; but those who are less fortunately situated are better relieved from it before it has done mischief.

Among the eighteen cases of *recent injury of the eye*, the majority were of no great importance; but the following seems worthy of special mention:

A man, *et. 45*, received a severe blow from an iron bar on the closed lids of the left eye, and applied as an out-patient within twenty-four hours. There was no pain, no mark of external injury; the cornea and aqueous humour were transparent; the iris was dull; the pupil closely contracted and plugged by effusion, and perception of light totally abolished. A strong solution of atropine (*gr. iv. ad 3j.*) was ordered to be instilled every four hours; and the patient was directed to return next day. He did so, and the anterior chamber was then found to contain pus, rising to about one-third the height of the vertical diameter; and the conjunctiva was injected. The man was admitted into the Hospital, and a large portion of the lower segment of the iris was excised. The suppurative inflammation was at once arrested; the wound healed quickly; perception of light returned; and in a week the patient could count fingers at a short distance. From this time no more improvement took place. By focal illumination, a buff-coloured substance could be seen at the lower part of the eyeball behind the lens, and the globe began to waste. Softening progressed so far, that the shape of the eye was modified by the pressure of its muscles; but this wasting was arrested, and the eye even became somewhat more firm, while a slight circum-corneal vascular zone gradually disappeared. Since then the lens has become opaque; but the patient still retains good perception of light with this eye, and there has been no irritation of the other. An attempt will by and by be made to remove the lens by suction; and if this fails to restore any useful vision, enucleation will probably be ultimately practised.

Among the *common forms* of eye-disease presenting themselves at the Hospital, the first place must be given to *blepharitis*—a general term used to include all the phases of follicular inflammation of the margins of the eyelids; that is to say, all that has been described by various writers as ‘*tinea tarsi*,’ ‘*ophthalmia tarsi*,’ ‘*lippitudo*,’ and by a variety of other names. Often commencing very insidiously, and, among the poor, being almost invariably neglected in its earlier stages, blepharitis soon assumes a character of remarkable obstinacy, and leads on to almost every conceivable form of superficial ocular

inflammation. Cases are often seen in which an apparent cure has once and again followed attention to cleanliness and the use of some astringent wash, but in which relapse has occurred as soon as these precautions were laid aside. The reputation for inveteracy which the malady has thus acquired is almost entirely due to forgetfulness of the anatomical conditions under which it exists. It is essentially a disease of the lining of the follicles of the cilia; and when apparently cured, it is still existing in the deeper parts of these follicles, and creeps out again over their margins as soon as an opportunity is afforded. When first seen, it is often limited to a few follicles only. Perhaps a group of three or four cilia will be found agglutinated together at the margin of the lid by a scab or crust, and at the base of this crust there is a swelling, manifest both to sight and touch, and extending about a line or a little more upwards upon the lid. If the crust be moistened and carefully removed, and the surface from which it falls examined with a lens, it will be seen that the follicles are patent, and exuding a little sticky discharge. The cilia are less firm than in the healthy condition, and can easily be plucked out by the finger and thumb. Oftentimes, indeed, they are absolutely loose, and are simply acting as foreign bodies in the follicles. The disease, if neglected, rapidly spreads to neighbouring follicles by contiguity, and affects the whole margin of the lid, which then appears unnaturally thickened and prominent. The acrid discharges from the affected follicles irritate the conjunctiva and cornea, producing inflammation of those membranes. The swelling of the lids interferes with the functions of the lacrymal puncta; and the retained tears not only themselves become sources of irritation, but they also entangle particles of dirt floating in the atmosphere, and these trouble the eyes both mechanically and chemically. In fine, a general chronic ophthalmia is set up, and may lead to complete loss of cilia, to considerable opacity of the cornea, to eversion or other deformity of the lids, and to the loss of the natural moisture and suppleness of the conjunctiva.

In order to cure blepharitis, nothing is necessary but

to take pains. The results it produces when neglected are often incurable; but the actual follicular inflammation yields readily to well-directed and careful treatment. In the first place, it is essential to remove the secretion, which shields the seat of the disease from the contact of remedies; and this secretion is not only viscid and glutinous in its own character, but is intermingled with greasy matter derived from the Meibomian glands. For its complete removal, a warm alkaline lotion should be employed; and a solution of bicarbonate of soda, in the proportion of five grains to an ounce of water, will be found very suitable for the purpose. With this lotion the edges of the eyelids may be carefully soaked, by means of a bit of fine sponge, until every particle of crust or viscosity can be removed without the smallest violence. When this is accomplished, and the margin of the lid dried by gentle pressure with a soft cloth, the cilia of the affected region should all be gently pulled, so that any which are loose may be extracted. A little soft ointment, containing either the red or the yellow oxide of mercury, should then be worked into the margin of the lid with a fine camel's-hair brush, so as to find its way into the affected follicles. The cleansing and application should be repeated at least once every twenty-four hours, and continued for several days after apparent recovery has taken place. If this be done effectually, a cure will always be obtained; but the awkwardness or carelessness of the patient or his friends will sometimes prove a source of insurmountable difficulty. When this is so, the cleansing with the soda lotion may be the only thing entrusted to home management, and the surgeon may himself apply diluted nitrate of silver to the margin of the lid every third day. For this purpose, the nitrate may be fused with twice its weight of nitrate of potash, and run into moulds, and the resulting pencils filed down to fine points for application. The margin of the lid should be very lightly moistened, so that the dissolved nitrate may find its way by capillary attraction into the follicles, but may not trickle down upon the conjunctiva.

In cases in which blepharitis of long standing has pro-

duced a state of chronic hyperæmia of the lining membrane of the eyelids, the chromic acid has been found the most generally useful local application. A morsel of the acid should be placed on a slip of glass, moistened with water by the point of a camel's-hair pencil, and the resulting solution applied to the everted lid, and washed off with water after a few moments, before the lid is allowed to return to its place. This application may be repeated twice a week. If there be actual granulation of the conjunctiva, very light scarification with the point of a sharp lancet may be employed every other day, and the surface touched, as soon as the bleeding has ceased, with a stick of diluted sulphate of copper (equal parts of sulphate of copper, nitrate of potash, and alum, fused together). By perseverance in this plan over a sufficient length of time, very excellent results may often be attained.

The numerous cases of *conjunctivitis* that have sought relief have been due sometimes to ordinary catarrh, sometimes to irritation set up by dust, noxious vapours, or foreign bodies, and sometimes to the hyperæmia induced by excessive work of the eyes in persons who required spectacles, but were not furnished with them. A simple astringent lotion of nitrate of silver or sulphate of zinc, of one or two grains to the ounce, with rest of the eyes, suffices for the speedy cure of the bulk of the cases; and an intractable or recurrent conjunctivitis will almost always be found associated either with some great error of the refraction, such as a marked degree of hypermetropia or astigmatism, or with a state of chronic irritation of the lacrymal passages. In such cases it is necessary first to test the vision after the instillation of atropine, and to remedy any error of refraction by suitable glasses; while, if no such defect be found, the lacrymal passages should be carefully injected through the puncta, by means of Anel's syringe, with such lotions as their condition may seem to require. The diagnosis of uncomplicated conjunctivitis may be arrived at with certainty when there is no diminution of the transparency of the cornea, no loss of lustre of the iris, no impairment of vision, and

when the injected vessels can for an instant be wholly emptied right up to the corneal margin by slight pressure with a finger through the medium of the eyelid. For this purpose the lower lid should at first be carried a little over the corneal margin, and then quickly glided back from it. The track left by the pressure should be absolutely white; and if there be the slightest pink zone around the cornea, something more than superficial inflammation must be recognised as existing or impending.

The cases of *inflammation* or *ulceration of the cornea* have amounted to nearly one-fifth of the whole; and the importance of the part affected, together with the frequency of its disorders, seem to call for some detailed mention of them. Not only may these affections permanently impair vision by causing localised or diffused opacity, but also, and in a very grave degree, by producing modifications in the general form and curvature of the membrane, which may either become covered with irregular facets, or may be rendered unduly prominent either generally or in one of its meridians. The question that chiefly concerns the practitioner in dealing with corneal diseases is, to assign a correct relative importance to constitutional and to local treatment. It may perhaps be said that there is a great tendency, on the part of those not specially engaged in ophthalmic practice, to neglect local applications, and on the part of specialists to neglect constitutional remedies. Of the two errors, the former is by far the most grave in its nature and the most serious in its effects. Diseases of the eye owe their importance almost entirely to the changes wrought by cell-proliferation, or other actions associated with the inflammatory process; and if we wait for the arrest of these actions by the comparatively slow operation of internal medicines and of regimen, we shall too often have mischief done that can never be wholly repaired. On the other hand, the neglect of necessary medication will almost surely be attended by speedy recurrence of the malady, and this, if repeated again and again, may ultimately be as disastrous as its originally unchecked continuance. As a matter of fact, however, in perhaps nine cases out of

ten, all the forms of corneal inflammation that are not due to syphilis can be speedily cured, for the time at least, by local treatment only.

Inherited *syphilitic keratitis* is certainly less frequent, and comparatively less severe, in London than in provincial practice. Probably this may depend upon the greater facilities for the treatment of primary syphilis that are afforded by the various metropolitan hospitals. The excessively bad cases that are associated with scarred features and deafness, and that produce dense corneal opacity, either permanent or of very long continuance, are only occasionally seen; and the common type is of a mild character, leaving only a faint interstitial turbidity. In all the cases some preparation of iron was given in combination with iodide of potassium; but it is difficult to say what influence such treatment really exerts upon a disease of essential chronicity, and that seems disposed to run a very definite course. In most of them an ointment containing some form of mercury was also applied locally, and a solution of atropine was instilled into the eyes during the acute stage of the disorder.

The condition that has been generically called *herpes of the cornea or conjunctiva*, and that consists in the development of phlyctenulæ, or quasi-vesicular eminences, terminating in small ulcers, has been of frequent occurrence. Recent investigation has shown that these eminences bear no relation to true herpes, but that they consist of collections of adenoid cells, deposited beneath the epithelium of the conjunctiva, or between the corneal epithelium and Bowman's membrane, and liable, in the latter situation, to burrow into the true corneal tissue by the side of its nerve-filaments. When the nerves are thus implicated, photophobia and lacrymation are commonly excited; but the disorder is otherwise almost entirely painless, and each separate elevation runs a speedy course. Partly on this account, partly because the tendency to recurrence is the essential feature of the disorder, the constitutional treatment is here of the first importance; and the administration of cod-liver oil will generally be especially valuable. When there is no photophobia, it is

usually well to touch the little ulcers with a fine point of diluted nitrate of silver; but when photophobia is present, some less stimulating application is generally desirable, and few will be found to answer better than a little pure calomel shaken into the eye from a brush or feather. At the same time the lids should be closed by a soft pad of cotton-wool and a light bandage, so that the ulcers may be relieved from the irritation due to constant friction. In the case of very young children, who would be likely to disturb a bandage, nearly the same effect may be gained by fastening down the upper lid to the cheek by one or two narrow strips of isinglass-plaster.

Inflammation or ulceration of the true corneal tissue has been seen under a variety of conditions—sometimes occurring without manifest cause, sometimes as a result of injury, sometimes from the irritation of ingrowing eyelashes, or of granulations of the palpebral conjunctiva, and in one case from exposure of a portion of the cornea by imperfect closure of the lids, due to deformity of the margin of the upper lid, as a consequence of blepharitis. In all these instances the treatment pursued has been, to remove all manifest sources of irritation, to apply atropine (both as a local sedative, and also as a means of affording rest to the eye by its influence in paralysing the ciliary muscle and the sphincter pupillæ), to scarify and stimulate granulations, to apply mercurial ointment to the cornea, and to keep the lids closed by compress and bandage. The form of mercurial ointment most commonly employed has been that which was introduced into practice by Dr. Pagenstecher, and is commonly called after his name. It contains a precipitated yellow oxide of the metal, thrown down by the addition of potass to a solution of the perchloride, and is used of different degrees of strength, ranging from ten to sixty grains to the ounce of soft simple ointment. It is applied, in very small quantity, upon the conjunctival surface of the everted lower lid.

The cases of *corneal ulcer* have included a single example of the form to which attention has lately been called by Professor Sämisch, under the name of creeping ulcer of the cornea (*ulcus serpens*); and this was treated

in the manner which the Professor has described, by a complete incision through the ulcerating part.

The patient was an elderly man, who was admitted complaining of great pain in the orbit and eyeball. When seen the next morning, he was very depressed, with a general dulness of the surface of the eye, which was at first supposed to be due to turbidity of the aqueous humour and commencing iritis. The pupil was much contracted, and only obscurely seen through the haze. Atropine was applied, and morphia injected under the skin of the temple. The next morning the pupil was widely dilated and circular; but the pain and haziness continued, and sight was very dim. Paracentesis of the anterior chamber gave exit to clear fluid, and did not diminish the haziness, which was thus seen to be in the tissue of the cornea. Morphia injections were repeated sufficiently often to keep the pain in abeyance; and the patient took quinine, with a generous diet, and continued the atropine. The next day a gray opacity showed itself, about midway between the centre and the lower margin of the cornea, and the upper eyelid assumed a dusky and swollen appearance. In twenty-four hours more the opacity had become an irregular ulcer, precipitous towards the centre of the cornea, spreading towards the margin, and surrounded by a gray border. Hot poultices were applied over the closed lids, and the next day the patient was placed on the operating-table. There was then considerable hypopyon. Chloroform having been given, a Gräfe's cataract knife, with its edge directed forwards, was made to pierce the cornea about a line on the temporal side of the ulcer, and to issue on the nasal side. The base of the ulcer was then divided, and the pus in the anterior chamber suffered to escape. The next day a marked improvement was manifest; the ulcer was no longer spreading; the cornea around it had begun to clear; and the pain was no longer urgent. The incision was re-opened along its whole length by the beak of a Weber's knife; and this re-opening was repeated daily for a week or ten days. By that time the destructive character of the morbid process seemed to be wholly changed; the pain had ceased, the eyelid had become natural, and the upper part of the cornea bright. The incision was then suffered to close; and the patient was discharged with only an insignificant cicatrix, lying quite below the pupillary opening.

The cases of *iritis* have presented several points of interest, especially with reference to the tendency to recurrence induced by adhesions. There is much reason to fear that the great importance of an early recognition of iritis, the very great injury that may be done by the use of astringent lotions, and the necessity of avoiding or overcoming adhesions by the free use of atropine, are matters not always sufficiently present to the minds of medical practitioners. Still more, then, does iritis furnish

examples of the evils incidental to that traffic between the foolish and the ignorant, which is delicately described as 'counter practice.' Cases are of constant occurrence in which iritis has been made a pretext for the sale of a lotion containing some mineral irritant, by which the inflammation has been greatly intensified, the still tender adhesions strengthened and confirmed, and the patient deprived of all possibility of cure by the aid of medicines only. More or less tardily, indeed, the actual inflammation will subside; but the adhesions remain, almost certain to light up another attack by their constant arrest of the natural movements of the pupil, and likely, if they do not do this, to be a source of glaucomatous hypersecretion as time goes on. No precept is more important to be borne in mind, no rule is more entirely without exception, than that which prescribes the use of atropine as a test if the presence of iritis is doubtful, as a remedy so soon as the presence of iritis is declared, and as a means of stretching or detaching adhesions, even for weeks after the inflammatory symptoms have subsided. And if adhesions should be formed which resist atropine, no patient should be suffered to consider himself cured, or free from the prospect of relapse, until they have been divided by surgical means.

For this purpose several operations have been devised, among which the earliest, the corelysis of Mr. Streatfield, still holds its ground. It is accomplished by making a small incision through the cornea at a point nearly opposite the adhesion, and by passing in a small flat spatula, having a hook cut in its side, by which the adhesion may be drawn towards the operator until it yields. Mr. Streatfield's original hook may be improved by having the notch made large enough for its inner edge to be distinctly sharpened, so as to *cut* the adhesion. If this be not done, the muscular tissue, softened by previous inflammation, will sometimes give way, and a hole will be torn in the iris, instead of the adhesion being detached. Or the iris may even yield at its ciliary attachment, and the rent may occasion much bleeding into the anterior chamber. In the event of either of these accidents occur-

ring, it will usually be well to make an iridectomy at the injured part. The hook may also be improved by being bent upon the flat, so as to give readier access to the nasal side of the eye.

The operation recently suggested by Dr. Passavant deserves a few words of notice. In this the incision through the cornea is as extensive as for an iridectomy, and is made at the margin of the cornea, on the same side as the adhesion. The operator then introduces a pair of fine iris forceps, the teeth of which have been filed down, into the anterior chamber, pinches up the iris close to the adhesion, and draws it towards the wound until it is released. The grasp is then relaxed, the forceps withdrawn, and any prolapsus iridis is reduced in the ordinary way. It would be premature at present to speak decidedly of the merits of this operation; but, while it is free from the risk of tearing the iris or of separating it from its ciliary attachment, it seems to be more liable than corelysis to produce inflammation, by which the adhesion may be reunited.

The use of mercury in iritis is a question on which there has been much difference of opinion; and practitioners who have had the courage to trust to atropine alone report that even the most severe cases ultimately make good recoveries under its use. The late Mr. Zachariah Laurence was accustomed to treat iritis successfully by the use of opium or morphia, in such doses and at such intervals as to maintain a semi-narcotised condition; the pupil, of course, being constantly dilated. This practice is at least so far worthy of being borne in mind, as that it recalls the necessity of subduing pain as an essential condition of the commencement of repair. In the eye at least, so long as the sensory nervous filaments are actively irritated, no resolution of inflammation must be hoped for; and, whether mercury be given or not, it is always good practice to use sedatives in any quantity that may be needful to procure ease and sleep. With regard to mercury, perhaps it is best to regard iritis as a disease ordinarily tending towards recovery, if only pain can be subdued, and if the pupil can be kept so fully dilated that it is no longer in contact with the anterior capsule, but is

separated from it by a thin layer of aqueous humour. If the free application of atropine and the reasonable use of opium can fulfil these conditions, other treatment will seldom be required. If, after twenty-four hours, the pupil is still contracted, the application of a leech to the outer angle of the orbit will oftentimes turn the scale in favour of the remedies. But if this resource should fail, and no amendment be manifest in twenty-four hours more, the best, because the safest, practice will be at once to administer mercury in decided doses. Mercury will always check the disease, and it need never be so used as to do harm to the patient. As regards the question here arising, it is probably not very material whether the iritis be syphilitic. It is quite certain that manifest syphilitic iritis will sometimes yield to atropine alone; and it is also certain that the non-syphilitic forms of the disease will sometimes require mercury.

There is, however, one physical condition to which attention should be directed, and which will resist all kinds of medicinal treatment. In some forms of iritis—especially the sub-acute and more insidious—a certain amount of hypersecretion takes place within the eye, by which the tension of the globe is increased, the coats are painfully stretched, the entrance of arterial and the exit of venous blood are impeded, the retina is injuriously compressed, and all nutritive changes are impeded. Such tension it is imperatively necessary to relieve by operation; and if this indication is early recognised, it may usually be fulfilled by paracentesis of the anterior chamber. A cutting needle should be thrust into the anterior chamber at the corneal margin and withdrawn, and the aqueous humour then evacuated by opening the little incision by a fine probe, or by the beak of Weber's lacrymal knife. In most cases it will be desirable to introduce the probe two or three times a day for the first few days, and thus to establish a drain of aqueous humour, which will, in fact, be a sort of indirect depletion of the vessels of the eye. But if the heightened tension has been existing for several days, or if it has attained a considerable degree, or especially if the pupillary margin is adherent to the anterior

capsule, so that the iris and lens together form a complete diaphragm between the aqueous and the vitreous chambers, a sufficient iridectomy should be performed without delay. Whenever, by either of these means, the tension is relieved and the circulation restored to its natural freedom, the value of the ordinary medicines will at once become apparent.

The cases of *glaucoma* have presented no special peculiarity, and have not been sufficiently numerous to have any bearing upon the general statistics of the affection. In one sub-acute case, in an elderly man whose vision was almost extinguished, its gradual return after iridectomy, and the gradual elevation of the cupped optic disk, have been very interesting and instructive.

Affections of the optic nerve and retina have come under observation in considerable number, but have presented few peculiarities requiring notice. An example of gray atrophy of the optic nerves from lead-poisoning is worthy of being placed on record; but the patient soon ceased attendance, probably going elsewhere in search of a more favourable opinion about his prospects. A man suffering from monocular syphilitic retinitis was admitted as an in-patient, and treated by calomel-vapour baths. Under their influence the deposit in the retina rapidly became absorbed, and the vision improved in a corresponding ratio. This patient, before his cure was complete, discharged himself from the ward; and has since attended only irregularly as an out-patient, taking the perchloride of mercury internally as a substitute for the previous treatment. Three cases of retinitis pigmentosa have attended; one of which is remarkable for the early period at which it has attained a high degree of development. The patient is a pallid and delicate-looking boy of ten years old. At the angles of the mouth he has conspicuous scars, resembling those seen in cases of inherited syphilis; but of such inheritance there is no other evidence. His parents are not blood relations, and are healthy, and his surviving brothers and sisters are also healthy; although some have died from 'water on the brain.' His disease has already progressed to entire extinction of vision in

one eye; and in the other the field is reduced to such narrow limits, that he can hardly walk in the streets with safety. The other cases were both in an earlier stage, and in young adults; and in neither of them was there any parental consanguinity.

Two patients admitted for disease of other parts of the eye (both females) have afforded examples of that comparatively rare formation, the passage of the sheaths of the nerve-fibres into the retina. In both, the resulting opacity was of small superficial extent, and limited to the upper portion of the fibres.

The cases of *choroiditis* have all been of the disseminated variety and bilateral, and have presented no characteristics calling for special notice. They have been under treatment too short a time for anything to be said about the probable eventual results.

A single example of *herpes zoster frontalis* has been seen, affecting the right side of a delicate boy nine years of age. The acute stage of the eruption was attended by much photophobia and lacrymation, and was followed, after a period of improvement, by small marginal ulcers of the cornea. It was only when these had healed that the ordinary circum-orbital neuralgia began to be experienced. Under the use of tonic and sedative treatment complete recovery was eventually obtained.

Many cases of *trichiasis* have been seen, of which some, chiefly occurring in young women, have affected only the cilia of the outer half of the upper lid. Complete cases have been most common in old women, usually in old Irishwomen, who had suffered from chronic blepharitis, and in whom the palpebral fissure had undergone contraction. In these some modification of Arlt's operation has been performed, and the palpebral fissure has been widened. The immediate effect has been good in every case; but in a certain proportion of these operations the improvement will not stand the test of time. The conditions which produced the original malposition continue in operation, and some degree of contraction recurs. It is therefore not uncommon to see patients who have undergone many operations, often at the hands of dif-

ferent surgeons, and whose last state is worse than their first. One woman, indeed, either as the result of one or of many efforts to give her relief, has practically been subjected to the same torture that was employed by the Carthaginians against Regulus. Her eyelids have been cut away; and one cornea has assumed a dermoid character. Cases of partial trichiasis have been treated by various modifications of transplantation, and sometimes only by regular evulsion of the cilia.

Obstruction of the lacrymal passages, generally affecting the nasal duct, has been treated chiefly by the careful and persevering use of silver probes; and this method, when the patient could attend regularly, has been almost invariably successful. In a few cases in which the tendency to contraction has been too obstinate to be thus vanquished, or in which the patient could come but seldom, the radial incision of the stricture by Stilling's knife has been the method usually practised. This, for a certain time, will always be effectual, and in a large proportion of cases the good result will be permanent. In others, however, contraction will eventually recur, and often in the very cases which seemed at first the least likely to be obstinate.

The applications on account of *strabismus* have been numerous, and the cases, with one exception, have been of the ordinary convergent and concomitant form. These have been operated upon by the various methods devised by Von Gräfe, Critchett, and Liebreich. In one instance of divergent squint, following an operation for convergent squint performed elsewhere, the following procedure was devised and carried out, with a result that, as far as can yet be judged, leaves nothing to be desired. Its various steps were suggested by the operations upon the muscles of the eye devised by Dr. Liebreich, and by Dr. Agnew of New York, and it had for its chief object to redress the deformity without sacrificing conjunctiva.

Horizontal incisions were first made through the conjunctiva and subconjunctival tissue, over the upper and lower borders of the tendon of the internal rectus muscle, from a point about a line distant from the margin of the

cornea, and as far inwards as to the caruncle. The strip of conjunctiva between these incisions was then completely detached from the parts beneath. Next, a strabismus hook, carrying a fine ligature by an eye drilled through its point, was entered at the lower incision, swept round all the attachments of the internal rectus, and brought out at the upper incision, when the ligature was seized and the hook withdrawn, so as to leave the ligature behind. The next step was to expose the tendon of the external rectus by a single horizontal incision over its median line, and to separate it completely from its attachment. A suture was then passed through the conjunctiva at the corneal extremity of each of the two parallel incisions over the internal rectus, and was tied in, leaving both its ends of sufficient length. One of each of these end sutures was then carried through the internal rectus tendon behind the ligature, the needle being introduced and brought out through the incision without piercing the conjunctiva. The internal rectus was then divided close to the eye, and the ligature withdrawn. The sutures passing through the tendon were then tightened, and each tied to its end fixed to the conjunctiva; so that the internal rectus was brought forward beneath the conjunctiva without removing any portion of that membrane, and without dividing it by any incision in a vertical direction transverse to the ordinary course of its vessels. The ends of one of the sutures were then threaded upon two needles, carried under the eyelids, brought out at points about a line apart on the inner side of the nose, and tied over a small roll of paper. They were suffered to remain until the fifth day from the operation, and were then removed. The cornea was at first turned somewhat inwards, and the partially detached flap of conjunctiva was red and tumid. These conditions soon underwent spontaneous change; and at the date of writing, the appearance of the eye may be almost described as normal.

It only remains to mention certain changes which have been decided upon for the better management of the ophthalmic department, and which come into opera-

tion with the commencement of the summer session. The patients have hitherto been seen on Mondays and Fridays in the morning; an arrangement which has to a great degree prohibited classification, and has thrown a stress of work upon an unsuitable period of the day.

For the future, patients will be seen in the afternoon three days a week, namely, on Tuesdays, Wednesdays, and Saturdays, at 2 P.M.; and fresh applicants will be received on each of these days. Those applying will be classified, so that all cases requiring only superficial examination and prescription will return upon Tuesday; all requiring operation, upon Wednesday; and all requiring ophthalmoscopic or optical examination, or testing of the field of vision, upon Saturday. In this way, visitors desiring to see any special class of work will always know when it will be in progress; and students will be enabled to proceed from the more simple to the more difficult branches of ophthalmology. The operations upon out-patients—which will include many cases of strabismus and trichiasis, and many requiring iridectomy—will be performed in the out-patients' room; and only those upon in-patients in the theatre. By this means the in-patients will be spared the present frequent intrusion of out-patients awaiting operation into wards that are already filled by their proper occupants.

R. BRUDENELL CARTER.

XXI. NOTES TAKEN IN A GERMAN FELD-LAZARETH.

Two weeks and a half had elapsed since the battle of Beaumont, when I became connected, at Mouzon, with one of the German Lazareths hastily organised to receive the victims of the 31st of August. In that short interval the numbers of the wounded had been terribly thinned. Most of those had been swept away whose frightful injuries lend to the field of battle its ghastly colours. My disappointment was not limited to sight-seeing; a nobler aim was in a great measure defeated, that of being useful to others and of furthering my own knowledge. The great pressure of surgical work had ceased; the knife had already corrected the blunders of shot and shell; little opportunity and no excuse remained for the interference of inexperienced hands. The somewhat passive watch I had to keep over the wounded intrusted to my care would have been more instructive had I known them from the beginning. But the best *dénouement* creates small interest where the first acts are wanting; and for that reason I must abstain from relating cases the history of which would lack its first and most striking chapters.

In the same way I am unable to give any competent opinion on many points of military and of surgical importance, such as the relative efficiency of the German and French weapons, the quality of the aiming, the extent to which amputation was practised after the various sets of lesions, and the results of primary amputations. On these and many others the next year will throw the light of elaborate statistics. For my own part I am reduced to offer a series of most various observations, picked up at different times and at different places, and which, though they be rather unconnected, I must endeavour to range

under the command of a captain. Several of them, I understood, were young artists, and belonged, therefore, to an educated sphere of society. Their equipment was very practically devised for their purpose. Each of them was provided with a horse, a knapsack, a hatchet, and a stout knife; a few other implements, as well as bandages, cordials, &c. followed their squadron in an ambulance wagon, also planned by them. They appeared to be a determined lot. They were taking their leave of a small town in Champaign, purposing to make their way to the front, which at that time meant Paris. I assisted at the review held by their captain, who inquired most carefully into the condition of each article of their accoutrement.

The lazareth where I was called to work was furnished with none of the advantages I have mentioned above. The locality was a wool manufactory, crowded with looms, in which every timber had imbibed the oil supplied to the machinery. Far from possessing female nurses, we were denuded of the most essential elements entering into the formation of a hospital. Our only resources were sacks imported from Germany, and straw to fill them obtained from the French stores. Blankets belonging to the German army had also been provided; which, in addition to the large campaigning cloak, helped to shelter the poor wretches from the cold night-air. A little later on, things improved materially. A few mattresses were provided; sheets, bandages, and compresses became more abundant, and the supply of charpie inexhaustible; the last-named being a great boon when wounds discharge profusely, and the dressing cannot be renewed several times a day.

The dressing of the wounds was greatly facilitated by two very simple implements, which had been with great foresight provided in large numbers for the use of the ambulances—the 'Eiter-becken' and the 'Irrigator.' The so-called Eiter-becken, or pus-basin, is a shallow tin vessel, which, if an anatomical comparison be permitted, could conveniently be termed kidney-shaped, being longer than it is wide, rounded at both ends, and provided with a convex and with a concave edge. By means of this curved

outline the basin can be made to fit accurately, if applied against any part of the body; and if used with ordinary intelligence, will spare the patient and the surgeon considerable annoyance by catching all the discharge. In our own hospitals a similar vessel would in many cases be found useful. In opening large collections of pus, and in the dressing of spinal operations, it could with advantage be substituted for wet tow, which, besides being often an imperfect receptacle for an abundant flow of matter, is certainly an unscientific one, and renders the examination of the discharge rather difficult. The Irrigator—a tin cylinder, provided at its lower level with a gutta-percha tube—was of the greatest service for injecting antiseptic lotions into the suppurating cavities. It was a rough but ready apology for a syringe, which was a scarce article.

The application universally used for the wounds was carbolic acid. A dressing of camphorated wine, or alcohol and water, was sometimes substituted when the granulations assumed a spongy flabby character. A thick pledget of charpie soaked with a few drops of a mixture of one part of carbolic acid and eleven of olive-oil was applied to the wound, and secured by means of a compress. In cases of amputation, a piece of tesselated lint interposed between the stump and the charpie was of great service in preventing loose filaments from becoming engaged under the flaps. An excellent adjunct to carbolic acid was the oakum, abundantly supplied by England; to the great delight of the German surgeons, who had not known it, and to the great comfort of the sufferers. As an eye-witness I may here refer to the extent to which relief, under all shapes, was tendered by this country. The supply of goods of all kinds from England was simply immense, and I can confidently say that, with the exception of charpie and old rags, two-thirds of the 'Liebes Gaben' had come from this side of the Channel.

Sickness was far less common in the German armies than their rough mode of campaigning would lead us to suppose. Amongst those for whom the hardships of the bivouac proved too much, only the small minority were attacked by the severer forms of disease. Cases of gastric

derangements were very numerous, as compared with cases of typhus and enteric fever; and dysentery made but a few victims to the thousands affected with simple diarrhoea. Again, great differences were noticed in the liability to sickness of the various nations represented in the German army. The strongest of all was decidedly the Prussian, the weakest the Saxon. The Bavarians also suffered heavily. Typhus, such as I saw it in various places, was not of the worst type; it was nearly the rule for recovery to follow. It was treated during the stage of fever by cold or cool baths, given once and sometimes twice a day; the immersion lasting a quarter of an hour. Internally, chlorinated water or the mineral acids were administered; and quinine was recommended in the second stage. The treatment of dysentery presented nothing remarkable; ipecacuan and castor-oil were the main agents employed.

2. The effect of a projectile is mainly influenced by three causes—its weight, its shape, and the velocity which is communicated to it. The Prussian bullet weighs a little more than one ounce; the French about three-quarters of an ounce. The latter is coniform; the former is a kind of compromise between a cone and a sphere, being somewhat pear-shaped, with its large rounded head foremost. The chassepot rifle carries at a distance of upwards of 1400 yards; the needle-gun has a range of some 800 yards. The velocity is consequently in favour of the French, the weight in favour of the Prussian. If we consider either bullet at the moment it falls, the Prussian will be the more dangerous of the two; but take them as they start, the difference in weight will be small compared with the great difference in speed. The same holds good for any distance within the range of the needle-gun; for when the one shot is spent, the other has accomplished but a little more than half its journey. If we exclude the rare cases in which the French rifleman hits his mark at the highest range, when the impetus of the bullet could be smaller than the resistance it met with, we generally find that the chassepot bullet overcomes all the obstacles

opposed to it by the structures of the body, and that it follows a straight course through skin, muscle, and bone, entering at one side and issuing at the other. The extent of injury it inflicted was, as a general rule, in direct proportion to the amount of resistance offered. In simply fleshy parts, the wound would be extremely small and clean; if a small bone were hit, the mischief would be comparatively small; as in the case of a German soldier, a medical student, whose hand was perforated, the bullet fracturing the second metacarpal, there was but little splintering, and consequently little laceration. The same man was wounded through the thigh; the femur was extensively fractured, and the aperture of exit was large and irregular from the tearing of the fragments.

Wounds from spent balls must have been much more common in the French ranks for the reasons above stated. Deviation must also have been more frequently observed, the rounded, nearly spherical, front of the German bullet exposing it to greater chances of being turned off than was the case with the sharp-pointed chassepot bullet. From the few French wounds which I saw, I am also inclined to think that the effect on bone was scarcely so formidable; although the skin-wounds were invariably larger and more contused, and the difference between wound of entrance and wound of exit well marked. It is a peculiarity of the chassepot wounds—owing, I infer, to the conical shape and great speed of the projectile—that when bone splinters have not been brought into play, the difference between the two apertures is so trifling as to be overlooked.

As a striking instance of the great power of the chassepot, I may relate the following case:

A little below and behind the trochanter was the small wound of entrance. The bullet had escaped about midway between the two points of attachment of Poupart's ligament; and between these two wounds the canal ran an oblique course forwards and inwards, shaving the posterior aspect of the femoral vessels. The limb was considerably shortened, the heel pointing to the internal malleolus of the other leg; whilst the everted foot rested with the whole of its outer border on the bed. The buttock was flattened; the hip appeared broader and higher than natural. In addition to this, there was a swelling in the groin. The finger passed into the good-sized valvular wound of exit could feel upwards the beat of the femoral artery, whilst it impinged below on a large spherical

body, which could not be mistaken. We had here to deal with a complicated case of fracture and of double dislocation, the head of the bone having slipped into the obturator foramen ; whilst the shaft was driven upwards and backwards into the dorsum ilei. The patient had already been weakened by many days of profuse suppuration. The proper treatment was to remove the cause of irritation ; but the spot was such a dangerous one, that I did not feel justified in assuming the responsibility of an operation ; and I referred the case to a German surgeon. The event justified my apprehensions. Incontrollable bleeding was induced by the first attempt at removing the head of the bone. The wound had to be considerably enlarged before it could give passage to the huge fragment, which consisted of the head of the femur and of part of the neck. The patient died in the twenty-four hours.

In this case the femur had been broken, and its fragments driven asunder, without the bullet experiencing any material deflection in its course.

3. There was in most instances on the part of German surgeons a great reluctance to operate. They were always anxious to give unaided nature her last chance ; by which they often seemed to deprive the patient of his. Professor Volkmann of Halle, whose great kindness I am glad to have this opportunity of acknowledging, expressed to me his belief that the surgical statistics of this war would bring to light a great progress in surgery, by the general adoption of more conservative ideas than had hitherto prevailed. He had a very poor opinion of the French surgery, which he had had an opportunity of seeing. He taxed the French with excessive and harmful surgical interference ; and, as an illustration, compared the numbers of primary amputation performed amongst equal numbers of French and of German wounded after the battle of Beaumont, the scale inclining heavily on the side of the French.

I had an opportunity of witnessing several amputations performed by German surgeons, some of them of considerable note. In none did I see the tourniquet used, and I gathered from them that it was not their practice to have recourse to it : they have a decided preference for the intelligent pressure of an assistant's finger. It so happened, however, that as a result of this exclusive faith in intelligent assistance, I witnessed a fatal loss of blood from the

femoral. That impressed deeply in my mind with regard to operations the truth of the popular maxim, 'safer is safest,' and that if an assistant can be intrusted with the compression of an artery, he must be equal to the easier management of a tourniquet. As contrasting with this unlucky occurrence I can mention a case of secondary amputation at the hip-joint, where by skilful digital pressure the loss of blood was reduced to a minimum; the case, however, ending fatally a short time after operation.

For the securing of bleeding arteries I have seen used excellent forceps, devised exactly on the same plan as our own torsion-forceps, but, as I consider, superior to them in practical value. The whole forceps is on a larger scale, making it more powerful, with the slight disadvantage of a greater weight. The wider bite and the more conspicuous slide are decided improvements, and make it a most serviceable artery forceps. Some stress seemed to be laid on getting the artery perfectly clear of all surrounding tissue and of its accompanying veins before passing the ligature; the veins when large received a special one. Torsion was not used for the smallest vessels, but their bleeding was checked by pouring a pail of cold water over the stump. The stump was left bare for twelve to sixteen hours after operation to glaze over, after which the sutures were applied.

I was rather struck by the mode of sewing up wounds which seems to be popular at Halle. Desirous of judging by personal experience of its results, which were much praised to me, I determined to practise it in the case of a patient where I performed Carden's amputation through the knee-joint; and to insure a correct copy of the process I obtained the help of Professor Volkmann's assistant. The number of sutures applied was precisely fifty. The finest silk cord was used. First six or eight stitches were thrown through the full thickness of the flaps, at the same intervals which are commonly observed in this country. These serving as framework, the needle was passed through the true skin alone, care being taken that the cut edges should be brought into perfect apposition, and yet remain free from any strangulation. This task once accomplished—scarcely

less trying for the surgeon's back than it was for the patient's limb—the stump presented an appearance which artists in the use of the needle would have admired, but about the real worth of which surgical opinion would have been divided. No later than the following morning an angry redness had spread along the edges, and made it urgent to lay the parts open; and after four days a narrow band of slough separated from either flap, leaving fortunately sufficient healthy skin to make a perfect covering. However unsuccessful this treatment proved in my hands, it was stated to be followed in Halle by most excellent results, particularly in cases of amputation of the breast.

4. At the time at which I entered upon my duties, the Lazareth of Mouzon contained chiefly wounds of the thigh. In accordance with stringent orders from the military authorities, all transportable cases had been hurried away to Germany. Fractures of the thigh did not belong to that class of wounded; I thus had an opportunity of seeing a good number of them and of watching their treatment.

Passing over the rough dressing applied on the battlefield, the object of which is to quench the bleeding and to render the removal to the next ambulance less dangerous to limb and life, the treatment of fracture of the thigh by German surgeons can be divided into three stages—that of simple extension; that of confinement in a plaster-of-paris bandage; and the third, during which a starch bandage is worn.

I was once asked by a German surgeon what weight was commonly used in England in the treatment of fracture of thigh occurring in an adult. He was much astonished to hear that four to six pounds was the average, and told me that they were in the habit of applying sixteen pounds, and often more. The fact that a small power long continued will tire out the strongest muscles of the body is too well known to be disregarded in Germany. The explanation of the use of so great a weight might perhaps be, that it was meant to overcome, together with the contraction of the muscles, the elasticity of the skin and areolar tissue of the limb.

If in our well-furnished hospitals extension is found rather difficult to practise, what must it be during a campaign, in the ambulance tent, or in the empty habitation whence the possessor has fled with his goods and chattels? This trouble was foreseen and obviated by an ingenious contrivance of Professor Volkmann, to which the name was given of 'Extensions Apparat.' Its merits lay in the fact, that under the most compact and portable shape it contains the means of establishing perfect extension and counter-extension, in the absence of a bedstead.

It is composed of three pieces—the footpiece, to which the power is applied; the stand, which I could call the fulcrum; and the perineal band, which is the main agent of the resistance.

The footpiece, for convenience of carriage and application, is made of two parts, one horizontal, the other vertical. The horizontal is a thin plate of iron, shaped for the reception of the lower third of the leg, and is perforated by a large hole for the heel. At its extremity, the vertical piece or sole is screwed at right angles; and the whole, thoroughly padded, is fastened to the leg by means of a few turns of bandage.

Two long strips of strapping have previously been applied to the inner and to the outer side of the leg, extending from a point a little below the seat of fracture down to the heel; and farther down, their ends are jointly fastened over a small transverse piece of wood, forming the foot of a stirrup, of which they would be the sides. A central hole in the wood admits the end of the whipcord supporting the weight, which can there be secured by a single knot.

The stand, in its unfolded state ready for use, presents a foot and a shaft. The foot is formed by two horizontal pieces crossing each other at right angles; and from the end of the longitudinal one, attached to it by means of a hinge-joint, rises the vertical shaft. The foot, which I have just described, is slipped under the mattress, where the patient's weight maintains it. The shaft is furnished with two pulleys; a smaller lower one, which can be moved upwards and downwards, and made to adapt itself to the

height of the bed, its only purpose being to convert the horizontal traction into a vertical one; and an upper one, from which hangs the weight, and the larger radius of which allows of the use of a bulky body, such as a large stone or piece of shell, in the shape of a weight.

Lastly, the perineal band, which is simply a rope interrupted in the region of the groin by a good-sized gutta-percha tube, is adapted and fastened to some fixed point behind the patient.

This flying apparatus is kept on for a week or ten days, according to the duration of the stage of inflammation and swelling. As soon as this somewhat subsides, plaster-of-paris bandage is applied.

My excuse for entering into the description of so trivial an operation as that of plastering up a limb is, that the manner in which it was then performed materially differs from what I have seen in St. George's Hospital.

The patient is stretched on a firm quadrangular table, his head and his shoulders being made to rest on a mattress; his buttocks, which should be brought well to the edge of the table, being raised on a kind of bridge, called 'Becken-stütze,' or pelvis-supporter, about five inches in height. A long stem of ivory, about three-quarters of an inch in diameter, is adapted by means of a screw firmly to the edge of the table, between the two thighs. It has been previously well padded. The scrotum is carefully to be carried to the side of the sound limb, so as to allow the upright thoroughly to fit in against the ramus of the ischium. Meanwhile the patient has been inhaling chloroform, and preparations have been made to produce forcible extension. The muscles being thoroughly relaxed, the pulleys are carefully worked until measurement gives the same length for both legs. At that point the rope is secured, and the bandaging begins. Next the skin comes a thin layer of cotton-wool, covered in by a turn of flannel bandage. Much of the success of the operation depends on the quality of the plaster and the experience of the plasterer. His office is to dip into water the muslin bandages, which have been dusted over with plaster, and to watch the moment when the air, ceasing to bubble up

from the immersed roller, the requisite amount of moisture is obtained.

The operator, aided by an assistant, who supports the limb in a perfectly horizontal position, and in a natural relation to the trunk, has simply to wind round layer upon layer of the muslin bandage; but in so doing he is not to lose sight of the situation of the wound. Of the various contrivances of which he has the choice, the following is about the best: a thin round is cut off an ordinary cork, and a pin is driven through the centre of it as far as its head; the cork is then applied over the exact spot of the wound, the point sticking out and serving as an unfailing landmark. The abdominal belt, which is the most difficult portion, is strengthened by means of the extra thickness of a folded compress, prepared in the same manner as the rollers.

The crust now remains to be applied; and this admits of no delay, for if of good quality and sufficiently thick, the plaster will rapidly congeal.

The splint ought to present the appearance of dryness after ten minutes, and yield on percussion a hollow resonant sound. This being the case, extension is discontinued, the patient is carefully slid up the table, where he remains until the bandage is thoroughly dry. The fenestra had better be cut open at once, and the cut edges of the splint pasted down to the subjacent skin by means of a layer of india-rubber collodion, which guards the splint against the infiltration of the discharge.

Thus fixed in the act of extension, the fracture has far more chances of uniting, whilst the wound suffers less irritation from the bone-fragments, and ceases to discharge so profusely. If the patient possesses a tolerably good constitution, he has an excellent prospect of recovery.

Under this treatment the shortening of the limb is reduced to a minimum. I have not seen it in any case less than one inch, and generally it was fully an inch and a half; but it must be remembered, that in these gun-shot injuries there is a great solution of continuity of the bone. In the post-mortem examination I have generally seen it amount to two inches. Taking the ulti-

mate shortening of the limb to be an inch and a half, we find that ground has actually been gained.

The third stage of the treatment needs no particular mention. The time of its adoption and its duration must be regulated by the peculiarities of each individual case.

5. Whilst at Stenay, a little town near Sedan, which has attained a certain amount of celebrity from the successful raid of the French garrison of Montmédy, resulting in the capture in their beds of the small Prussian force of occupation, I visited the hospital, which was under the guidance of Dr. Ducluzaux, a French surgeon; and I think that his mode of treatment deserves particular notice, as it contrasts by its very simplicity with the favourite dressing of the day. Dr. Ducluzaux's great agent is pure water, the mode of application continual irrigation. The wounded limb is placed on a slightly inclined surface, furnished at its most depending edge with a tin gutter which empties itself below. The water drops from a funnel-shaped vessel suspended above the bed; the flow is regulated by squeezing a perforated cork more or less tightly into the neck of the funnel. I have Dr. Ducluzaux's own confession that he was astonished at his good results. The inflammatory symptoms and the local swelling were subdued with the greatest rapidity, and the wounds seemed to be guarded against all deleterious influences.

The most recent observations all seem to point to the fact, that air is the vehicle of all agents of fermentation. Air being their native element, we may suppose that by excluding air, by replacing it by some other medium less favourable to the development of germs (this being a convenient term for that hypothetical something whose effects we see, though its essence be out of our reach), we shall materially lessen, perhaps entirely stop, their action. *Corpora non agunt nisi soluta* was the old alchymists' doctrine. True for the crystal, is it equally true for the septic germ? Or is the law reversed for the latter? Is it destroyed in its vitality or paralysed in its activity when its element is changed? At a period when such great efforts have been made to discover the means of purifying the

air which comes into contact with wounds, and when the antiseptic dressing has reached its most efficacious but also its more complicated form, it might not be out of season to try whether analogous results could not be obtained from the use of more simple agents.

It was Dr. Ducluzaux's intention to publish after the end of the war a few of his observations. From them, and from the results obtained by other observers, we may hope to learn what the real value of the treatment by water is, and to what extent it screens the wounded surfaces from the action of the air and its germs.

I have travelled rather far away from my original subject. My excuse must be, that I do not intend to resume it, and that the reader will be spared the trouble of retracing his steps, these being the last remarks furnished by my note-book.

W. EWART.

INDEX.

- ABDOMEN, cases of injuries of the, in 1869, 267.
Abdominal tumour, case of, 253.
Adhesions, forcible rupture of, in ankylosis, 154.
Ætiology of pneumonia, 135.
Allbutt, Dr. T. C., on the effects of overwork and strain on the heart and great blood-vessels, 23.
Ammonia, caustic poisoning by, 72.
Amputations in 1869, see table of operations.
Aneurysm, cases of, in 1869, 277.
Ankylosis, 149; bony, 159; of the jaw, 158.

Back, cases of injuries of the, in 1869, 267.
Barclay, Dr., on scarlet fever, 167.
Blake, Dr., on cases of accidental poisoning, 69.
Blandford, Dr., on recurrent insanity, 111.
Bone, cases of diseases of, in 1869, 273.
Bony ankylosis, 159.
Bread, effects of its administration in diabetes, 202, 216.
Bristowe, Dr., views of, on diseases of the heart, 35.
Brodhurst, Mr., on ankylosis, 149.

Calabar bean in chorea, 12.
Carbolic acid, use of, as a dressing in the German field-hospitals, 369.
Carter's, Mr., report of ophthalmic cases from Oct. 1870 to Feb. 1871, 841.
Cheadle, Dr., on labio-glosso-laryngeal paralysis, 128.
Chest, cases of injuries of the, in 1869, 267.
Chorea, Calabar bean in, 12.
Circulation, cases of surgical diseases of the organs of, in 1869, 278.
Committee, the, on venereal diseases, 77.
Copeman, Dr., on scarlet fever, 55.

Death-rate of scarlet fever in London, 177.
Diabetes, 193.
Digestion, surgical diseases of the organs of, in 1869, 281.

Diphtheria, cases of, in 1869, 251.
Distrain of the heart, 119.
Epidemic character of scarlet fever, 167.
Erysipelas, cases of, in 1869, 250, 272.
Kwart, Mr., on the German field-hospitals in the late war, 365.
Extremity, upper, cases of injuries of the, in 1869, 268; lower, 270.

Face, cases of injuries of the, in 1869, 266.
False ankylosis, 149.
False joint, formation of, in ankylosis, 162.
Femur, removal of wedge-shaped portion of, in ankylosis, 161.
Fever, cases of, in 1869, 249.
Field-hospitals, German, in the recent war, 365.
Fractures from gunshot, 374.
Fuller, Dr., jottings from clinical practice, 1.

Generative organs, diseases of, in 1869, 283.
German armies, their sanitary state during the war, 369.
Glanders, case of, 250.
Gout, cases of, in 1869, 252.
Gunshot wounds, 370; operations in, 372; fractures, 374.

Haward, Mr., on scrofula, 99.
Head, cases of injuries of the, in 1869, 268.
Heart, distrain of, 119; valvular murmurs of, 1.
Hernia, cases of, in 1869, 281.
Honey, effects of its administration in diabetes, 200, 216.
Hydatids of liver, case of, 257.

Inguinal glands, affections of, in syphilis, 83.
Insanity, recurrent, 111.
Intussusception caused by polypus, 255.
Irrigation in gunshot wounds, 378.

Jaw, ankylosis of the, 158.
Joints, cases of disease of, in 1869, 276.

- Jones, Dr., on smallpox at St. George's Hospital, 229.
- Labio - glosso - laryngeal paralysis, 123.
- Leigh's, Mr., report of surgical cases for 1869, 263.
- Liver, case of hydatids of, 257.
- Medical cases in 1869, report of, 249.
- Mercury, its administration in syphilis, 88.
- Miasm of scarlet fever, its nature, 168.
- Murmurs, cardiac, 1.
- Myers, Mr., views of, on diseases of the heart, 25.
- Nervous system, cases of surgical diseases of, in 1869, 279.
- Ophthalmic cases, report of, 316, 341.
- Osteo-arthritis, 14.
- Overwork, effects of, on heart and vessels, 23.
- Paracentesis thoracis, 7.
- Paralysis, labio - glosso - laryngeal, 123.
- Plaster splint, 376.
- Pneumonia, etiology of, 135.
- Polypus, cases of intussusception of bowel from, 255.
- Power's, Mr., report of ophthalmic cases from Dec. 1868 to July 1870, 316.
- Rain, influence of, as a cause of pneumonia, 140.
- Recurrent insanity, 111.
- Report of medical cases, 1869, 249.
- Respiration, cases of surgical diseases of the organs of, in 1869, 278.
- Re-vaccination in St. George's Hospital, 241, 243; in the Life Guards, 247.
- Rheumatic gout, 14.
- Rheumatism, cases of, in 1869, 252.
- Scarlet fever, 55, 167; its method of propagation, 172; death-rate of, 177.
- Scrofula, 99.
- Season, influence of, on mortality of scarlet fever, 186.
- Secretions, the, as guides to treatment, 17.
- Section, subcutaneous, of bone in ankylosis, 162.
- Skin and its appendages, cases of disease of, in 1869, 280.
- Smallpox, outbreak of, at St. George's Hospital, 229; method of its propagation in the Hospital, 236.
- Stone, operations for, in 1869, 306.
- Strain, effects of, on heart and great vessels, 23, 119.
- Sturges, Dr., on the etiology of pneumonia, 135.
- Sugar, quantity of, in diabetic urine, 195; effects of its administration in diabetes, 198, 216.
- Syphilis, on the modern treatment of, 77; pathology of, 79; mercury in, 88.
- Syphilisation, 95.
- Tables of medical cases for 1869, 259; of surgical cases, 236; of compound fractures, 292; of operations, 296; of ophthalmic cases, 332; of urine in diabetes, 195, 219.
- Tenotomy in ankylosis, 150.
- Thompson, Dr. R., on distrain of the heart, 119; report of medical cases in 1869 by, 249.
- Thorax, paracentesis of, 7.
- True ankylosis, 159.
- Tuberculosis, 102; case of acute, 252.
- Uræmia, 11.
- Urea, amount of, in diabetic urine, 195.
- Urinary organs, diseases of, in 1869, 283.
- Valves of heart, rupture of, by sudden exertion, 36.
- Valvular murmurs, 1.
- Venning, Mr., on the modern treatment of syphilis, 77; on re-vaccination, 247.
- Veratris, poisoning by, 69.
- Wadham, Dr., on diabetes, 193.
- War, field-hospitals in the late, 365.
- Weather, influence of, in producing pneumonia, 136.
- Wedge-shaped piece of bone, removal of, in ankylosis, 161.
- Wilson, Mr., on re-vaccination in St. George's Hospital, 243.
- Wind, influence of, as a cause of pneumonia, 141.

END OF VOL. V.

NB157

